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Final Response to BDAT Related Comments Document Volume 1A-1. General BDAT Issues

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National Technical Information Service
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FINAL
RESPONSE TO BDAT RELATED COMMENTS DOCUMENT

General BDAT Issues

VOLUME I-A-1

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INTRODUCTION

This response to comments document only addresses those comments which were submitted on the proposed land disposal restrictions for those waste codes and general BDAT technologies and issues which relate to Third Third Wastes Treatment Standards.

The commenters presented in this document are grouped according to major concerns of the commenters. This document is comprised of the following sections:

ISSUE CODE 1: General BDAT Aspects
ISSUE CODE 2: D001 - Characteristic Ignitable Wastes
ISSUE CODE 3: D002 - Characteristic Corrosive Wastes
ISSUE CODE 4: D003 - Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents
ISSUE CODE 5: D004/D010 - Characteristic Wastes for Arsenic and Selenium and K, P, and U Wastes Containing Arsenic and Selenium
ISSUE CODE 6: D005 - Characteristic Wastes for Barium and P013
ISSUE CODE 7: D006 - Characteristic Wastes for Cadmium
ISSUE CODE 8: D007 - Characteristic Wastes for Chromium
ISSUE CODE 9: D008 - Characteristic Wastes for Lead P and U Wastes Containing Lead
ISSUE CODE 10: D009 - Characteristic Wastes for Mercury P and U Wastes Containing Mercury
ISSUE CODE 11: K044, K045, K047: Wastes from the Manufacturing and Processing of Explosives
ISSUE CODE 12: D011 - Characteristic Wastes for Silver
ISSUE CODE 13: P119, P120 - Vanadium Containing Wastes
ISSUE CODE 14: P and U Wastes Containing Thallium
ISSUE CODE 15: Mixed Radioactive Hazardous Wastes
ISSUE CODE 16: Polynuclear Aromatic U Wastes
ISSUE CODE 17: Halogenated Aliphatic U Wastes
ISSUE CODE 18: Non-halogenated Aromatic U Wastes
ISSUE CODE 19: F002-F005 - Solvents
ISSUE CODE 20: F006 - Electroplating WW Treatment Sludges
ISSUE CODE 21: F019 - Aluminum Conversion Coating Treatment Sludges
ISSUE CODE 22: F025 - Wastes from Production of Chlorinated Aliphatics
ISSUE CODE 23: K002-K008 - Inorganic Pigments

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OPTIONAL FORM 272 (4-77)
(Formerly NTIS-35)

ISSUE CODE 24: K011/K013/K014 - Acrylonitrile

ISSUE CODE 25: K015 - Still Bottoms from Benzal Chloride

ISSUE CODE 26: K021 - Spent Antimony Catalyst.

(No Comments Were Received for this Waste Code)

ISSUE CODE 27: K046 - WW Treatment Sludges from Manufacturing, Formulating, and Loading of Lead-Based Initiating Compounds

ISSUE CODE 28: K060 - Ammonia Still Lime Sludge.

(No Comments Were Received for this Waste Code)

ISSUE CODE 29: K061 - Electric Arc Furnace Dust

ISSUE CODE 30: K069 - Emission Control Dust/Sludge from Secondary Lead Smelting

ISSUE CODE 31: K071, K106 - Mercury Cell Process Wastes

ISSUE CODE 32: K073 - Chlorinated Hydrocarbon Wastes.

(No Comments Were Received for this Waste Code)

ISSUE CODE 33: K086 - Residues from Ink Formulation

ISSUE CODE 34: K100 - Waste Leaching Solution from Acid Leaching of Emission Control Dust/Sludge from Secondary Lead Smelting

(No Comments Were Received for this Waste Code)

ISSUE CODE 35: Wastes Containing Cyanide

ISSUE CODE 36: K017 - Wastes from the production of Epichlorohydrin

(No Comments Were Received for this Waste Code)

ISSUE CODE 37: K028,K029, K095, K096 - Production of 1,1,1-Trichloroethane

ISSUE CODE 38: Wastewaters containing BDAT Constituents

ISSUE CODE 39: K022 - Wastes from the Production of Phenol/Acetone

ISSUE CODE 40: K025 - Distillation Bottoms from the Production of Nitrobenzene

ISSUE CODE 41: K035 - WW Treatment Sludges from the Production of Creosote

ISSUE CODE 42: K026 - Stripping Still Tails from the Production of Methyl Ethyl Pyridine

(No Comments Were Received for this Waste Code)

ISSUE CODE 43: K083 - Distillation Bottoms from the Production of Aniline

ISSUE CODE 44: Oxygenated Hydrocarbons and Heterocyclic U and P Wastes

ISSUE CODE 45: F024 - Production of Chlorinated Aliphatic Hydrocarbons

ISSUE CODE 46: Halogenated Organic, Pharmaceutical, Brominated Organic, Organo-Sulfur Compound, and Organo-Nitrogen Compound Wastes

ISSUE CODE 47: Halogenated Pesticide and Chlorobenzene, Halogenated Phenolic, and Phenolic Wastes

ISSUE CODE 48: K048-K052 - Petroleum Refining Industry Wastes

ISSUE CODE 49: K036 - Organophosphorous Wastes (Nonwastewaters)

(No Comments Were Received for this Waste Code)

ISSUE CODE 50: K037

(No Comments Were Received for this Waste Code)

ISSUE CODE 51: Leachates

ISSUE CODE 52: Gases

Commenters are identified by both commenter number and commenter name. Comments within each section of this document have been assigned a sequential comment number.

Issues were obtained from the original comment submittal and were categorized based on the grouping specified above. The Agency's response to each comment follows immediately after the text of the document. For responses related to capacity issues, the reader should review the "Response to Comments Background Document for the Third Third Land Disposal Restrictions Proposed Rule, November 22, 1989. Volume II Capacity Related Comments." For information regarding broad policy questions, the reader is directed to the "Response to Comments Background Document for the Third Third Land Disposal Restrictions Proposed Rule, November 22, 1989. Volume III Policy Related Comments."

TABLE OF CONTENTS

VOLUME I-A

ISSUE CODE 1: General BDAT Aspects

A. Request for Data
B. Handling of Data
C. Availability of Technology
D. PQLs
E. Wastewaters/Nonwastewaters
F. Grab/Composite Samples
G. Quantification Complications for P and U Wastes
H. Soil and Debris
I. Stabilization
J. Recovery/Recycling Technologies
K. Treatment Standards for Treatability Groups
L. Ammonia Wastes
M. Technology as Treatment Standard
N. Treatment of Residues
O. TCLP vs. EP
P. Analytical Concerns
Q. Treatment Standards for Characteristic Wastes
R. No Land Disposal
S. Wastes with Multiple Characteristics
T. Incineration/Fuel Substitution
U. Transfer of Treatment Standards or Performance Data
V. Definition of K112
W. Treatment Standards for P and U Wastes
X. Treatment Technologies for Metals
Y. Statistical Analysis

VOLUME I-B

ISSUE CODE 2: D001 - Characteristic Ignitable Wastes

A. Treatment Issues Concerning Aqueous Wastes in the Ignitable Liquids Subcategory
B. Other Issues Concerning Treatment Standards for the Ignitable Liquids Subcategory
C. Treatment Standard for Ignitable Compressed Gases
D. Issues Concerning Deactivation Treatment Standards
E. Definitions of Subcategories
F. Dilution

VOLUME I-C

ISSUE CODE 3: D002 - Characteristic Corrosive Wastes

A. Proposed pH Requirement
B. Proposed Insoluble Salt Requirements
C. Incineration
D. Dilution
E. Miscellaneous Issues

VOLUME I-D

ISSUE CODE 4: D003 - Characteristic Reactive Wastes and P and U Wastes Containing Reactive Listing Constituents

A. Deactivation Technology Alternatives
B. Cyanide Treatment Standards
C. Other Cyanide Issues
D. Sulfide Treatment Alternatives
E. Proposed Insoluble Salt Requirement for Sulfides
F. Reactive Sulfide Definition
G. Explosive, Water Reactive, and other Reactive Wastes
H. P and U Waste Issues

VOLUME I-E

ISSUE CODE 5:D004/D010 - Characteristic Wastes and K, P, and U Wastes Containing Arsenic/Selenium

A.-. Aqueous Wastes are Incompatible with Vitrification

B.-.Air Emissions

C.-. Scrubbers to Control Emissions from Incinerators

D.-. Chemical Oxidation and Stabilization as BDAT in lieu of Vitrification

E.-. Treatment of Organoarsenic bu Incineration in lieu of Vitrification

F.-. Furnaces Permitting

H.-. Vitrification Residues

I.-. Chemical Treatment as BDAT for Arsenic

J.-. Alternative Technologies to Vitrification

K.-. Vitrification is not Demonstrated

L.-. Vitrification Technology is not Available

M.-. Stabilization as BDAT for Arsenic

N.-. Stabilization Unsatisfactory

O.-. Vitrification Data Supplied

P.-. Vitrification Supported as BDAT for As/Se

Q.-. TCLP with Glasses Can Give Misleading Results

R.-. BDAT is Technically Flawed

S.-. Stabilization as BDAT for As/Se

T.-. Not Treatable, non-defined Se Waste

U.-.Standard Inconsistency

V.-. Hexafluoroarsenate

X.-. Levels at/Above/Below Characteristic EP Level

Y.-. Permitting Vitrification Devices

Z.-. Specification of Treatment Standards

AA.-. Segregation of Arsenic Wastes in Landfills

BB.-. Hexafluoroarsenate

CC.-. Waste Treatment Levels

EE.-. Solubilities

FF.-. Standards Deficiencies

GG.-. Data

HH.-. Chemical Fixation

II.-. Inconsistent Standards

VOLUME I-F

ISSUE CODE 6:D005 - Characteristic Wastes for Barium and P013

A.-. Data Submission
B.-. Treatment Standards
C.-. Preamble vs. Proposed Rule
D.-. MCLG Standard
E.-. Treatability Group for Parium Wastes Containing Organics
F.-. Drinking Water Levels of Barium

ISSUE CODE 7:D006 - Characteristic Wastes for Cadmium

A.-. Problems in Management of Household Battery Wastes
B.-. Cadmium Wastes not Similar to F006 or K061
C.-. Set Standards at EP Level
D.-. Set Treatment Method Instead of Level
H.-. Foundry Wastes Cannot Meet Standards
I.-. Inconsistencies in Setting Standards
K.-. Allowance of Alternate Technologies
L.-. Stepwise Recovery of More than One Constituent may Require Processing at More than One Site
M.-. Most Batteries are not Hazardous Wastes
N.-. Data Submittal

VOLUME I-G

ISSUE CODE 8:D007 - Characteristic Wastes for Chromium

A.-. Treatment Standards
B.-. Treatment Data
C.-. Treatability of Waste/Group
D.-. Total Chromium vs Hexavalent or Trivalent Chromium
E.-. Miscellaneous
F.-. Comments on Data

VOLUME I-H

ISSUE CODE 9:D008 - Characteristic Wastes for Lead P and U Wastes Containing Lead

A.-. Characteristic Level as Treatment Technology
B.-. Wastewaters Treatment Data
C.-. Wastewaters - Validity of Transfers from K062
D.-. Specific Use of Chemical Precipitation
E.-. Treatment Data for Nonwastewaters
F.-. Validity of Transfer of Stabilization Data to D008
G.-. Stabilization as an Effective Treatment Technology for Lead Wastes
H.-. Application of Recovery to D008 High Level Nonwastewaters
I.-. Proposed Cutoff Level for Recovery
J.-. Lead Acid Batteries-Further Specification of "Metal Recovery"

VOLUME I-I

ISSUE CODE 10: D009 - Characteristic Wastes for Mercury P and U Wastes Containing Mercury

A.-.Data Submission Only
B.-.Thermal Recovery Standard; Demonstrability
C.-.Establishment of BDAT Standard at Level Below the Characteristic Level
D.-.Stabilization as BDAT or Sulfide Precipitated D009 as BDAT
E.-.Alternative Treatment for "Debris" and Other Wastes
F.-.Reconsideration of the Retort Cutoff Level
G.-.Treatment Standard for Mixed Waste
H.-.Indigenous Waste

ISSUE CODE 11: K044, K045, K047 - Wastes from the Manufacturing and Processing of Explosives

A. Treatment Standard

VOLUME I-I

ISSUE CODE 12:D011 - Characteristic Wastes for Silver

A.-. Treatment Standards
B.-. Precipitation
C.-. Concentration-based Standards vs. Recovery or Stabilization

ISSUE CODE 13: P119, P120 - Vanadium Containing Wastes

A.-. Treatment Technology
B.-. Waste Classification
C.-. Treatment Standards
D.-. Data Submission

ISSUE CODE 14: P and U Wastes Containing Thallium

A.-. Data Submission

VOLUME I-J

ISSUE CODE 15: Mixed Radioactive Hazardous Wastes

A. Radioactive Lead Wastes
B. Radioactive Mercury Wastes
C. Radioactive Zirconium Fines
D. Other Radioactive Wastes

ISSUE CODE 16: Polynuclear Aromatic U Wastes

A. Treatment Standards
B. Recycling/Reuse

ISSUE CODE 17: Halogenated Aliphatic U Wastes

A. Treatment Standards
B. BDAT

VOLUME I-J

ISSUE CODE 18: Non-halogenated Aromatic U Wastes

A. Treatment Standards
B. Recycling/Reuse

ISSUE CODE 19: F002-F005 - Solvents

A.-. Method of Detection
B.-. Biological Treatment
C.-. Treatment Standard
D.-. 2-nitropropane Standard
E.-. Definition of Wastewater and Solvent Mixtures

ISSUE CODE 20: F006 - Electroplating Wastewater Treatment Sludges

A.-. Wastewater Definition
B.-. Treatment Standard
C.-. F006 Subcategory
D.-. Analytical Methods

ISSUE CODE 21: F019 - Aluminum Conversion Coating Treatment Sludges

A.-. Analytical Methodology
B.-. BDAT
C.-. Treatment Standards

VOLUME I-K

ISSUE CODE 22: F025 - Wastes from Production of Chlorinated Aliphatics

A. Treatment Standard

ISSUE CODE 23: K002-K008 - Inorganic Pigments

A.-. Support Standard
B.-. Background Document Corrections
C.-. Sampling Frequency

ISSUE CODE 24: K011/K013/K014 - Acrylonitrile

A.-. Wastewater Definition
B.-. Acrylonitrile Standard
C.-. Performance Data
D.-. Numerical Standard vs. Wet Air Oxidation Method
E.-. Data Request

ISSUE CODE 25: K015 - Still Bottoms from Benzal Chloride

A.-. Nickel Standard
B.-. Organic Standards

ISSUE CODE 26: K021 - Spent Antimony Catalyst

No Comments Were Received for this Waste Code

ISSUE CODE 27: K046 - WW Treatment Sludges from Manufacturing, Formulating, and Loading of Lead-Based Initiating Compounds

A. Treatment Standard
B. Stabilization Technology
C. Deactivation Technology
D. Waste Minimization
E. Analytical Data

VOLUME I-K

ISSUE CODE 28: K060 - Ammonia Still Lime Sludge

No Comments Were Received for this Waste Code

ISSUE CODE 29: K061 - Electric Arc Furnace Dust

A.-. Wastewater Treatment Standard
B.-. High Temperature Metals Recovery and Residuals
C.-. Treatment Technologies for Nonwastewaters
D.-. Availability of High Temperature Metals Recovery

ISSUE CODE 30: K069 - Emission Control Dust/Sludge from Secondary Lead Smelting

A. Treatment Standard

VOLUME I-L

ISSUE CODE 31: K071, K106 - Mercury Cell Process Wastes

A. -. Data Submission Only
B.-. Thermal Recovery Standard: Demonstrability
C.-. Treatment Standard for K071 and K106 Wastewater
D.-. Multimedia Impacts
E.-. Stabilization as BDAT Option
F.-. Retain Existing BDAT Standard for K071 Nonwastewater
G.-. Reconsideration of Retort Cutoff Level
H.-. Indigenous Waste

ISSUE CODE 32: K073 - Chlorinated Hydrocarbon Wastes

No Comments Were Received for this Waste Code

VOLUME I-L

ISSUE CODE 33: K086 - Residues from Ink Production

A.-. Treatment Standards
B.-. Subcategories
C.-. Total Chromium vs Hexavalent Chromium
D.-. Mixture and Derived-from Rule
E.-.Soft Hammer

ISSUE CODE 34: K100 - Waste Leaching Solution from Acid Leaching of Emission Control Dust/Sludge from Secondary Lead Smelting

No Comments Were Received for this Issue

ISSUE CODE 35: Wastes Containing Cyanide

A.-. Analytical Methodology
B.-. BDAT
C.-. Treatment Standards
D.-. Soil/Debris

VOLUME I-M

ISSUE CODE 36: K017 - Wastes from the production of Epichlorohydrin

No Comments Were Received for this Waste Code

ISSUE CODE 37: K028,K029, K095, K096 - Production of 1,1,1-Trichloroethane

A.-. Nickel Standard

VOLUME I-M

ISSUE CODE 38: Wastewaters containing BDAT Constituents

A.-. U and P Wastewater Standards
  i. Wastewater Standards Below the de Minimis Levels
  ii. Use of MSL Wastewater Standards for U, P, F, K Wastewater Standards
  iii. Biotreatment Data as BDAT for Wastewater Standards
B.-. Wastewaters Containing BDAT List Constituents Document
  i. Data Screening
  ii. Demonstrated Technologies
  iii. Database Hierarchy
  iv. Variability Factors
  v. ITD Effluent Limits

ISSUE CODE 39: K022 - Wastes from the Production of Phenol/Acetone

A.-. Treatment Standards
  i. Organics
  ii. Metals
B.-. Use of Scrubber Water Data to Establish Wastewater Treatment Standards

ISSUE CODE 40: K025 - Distillation Bottoms from the Production of Nitrobenzene

A.-. Treatment Standards for Metals
B.-. Use of Scrubber Water Data to Establish Wastewater Treatment Standards

VOLUME I-M

ISSUE CODE 41: K035 - WW Treatment Sludges from the Production of Creosote

A.-. Use of Scrubber Water Data to Establish Wastewater Treatment Standards

ISSUE CODE 42: K026 - Stripping Still Tails from the Production of Methyl Ethyl Pyridine

No Comments Were Received for this Waste Code

ISSUE CODE 43: K083 - Distillation Bottoms from the Production of Aniline

A.-. Use of Scrubber Water Data to Establish Wastewater Treatment Standards

ISSUE CODE 44: Oxygenated Hydrocarbons and Heterocyclic U and P Wastes

A.-. Oxygenateds

- i. Carbon Adsorption Requirements for U147 (Maleic Anhydride)
- ii. Support a Numerical Standard for U147 (Maleic Anhydride)
- iii. Support a Numerical Standard for U154 (Methanol)
- iv. Caustic Treatment as Alternative BDAT for P003 (Acrolein)
- v. Oppose Nonwastewater Standard for U002 (Acetone)
- vi. Fuel Substitution as BDAT for Oxygenated Hydrocarbon and Heterocyclic Wastes

VOLUME I-M

ISSUE CODE 45: F024 - Production of Chlorinated Aliphatic Hydrocarbons

A. Treatment Standard
  - i Dioxins and Furans
    - a. Treatment Firms Refusal to Accept F024
    - b. Surrogate Constituents for Dioxins and Furans
  - ii Metals
  - iii Organics

B. BDAT for Nonwastewater Organics

C. Listing Definitions for F024
  - i Wastewaters
  - ii Revised Listing Definitions

VOLUME I-N

ISSUE CODE 46: Halogenated Organic, Pharmaceutical, Brominated Organic, Organo-Sulfur Compound, and Organo-Nitrogen Compound Wastes

A.-. Halogenated Aliphatics
  - i. Wastewater Standards at Drinking Water Levels

B.-. Organonitrogen Compounds
  - i. P063 (Hydrocyanic Acid) or Cyanide as Surrogate for P069 (Methylacetonitrile)
  - ii. Standards and Capacity for U007 (Acrylamide)
  - iii. Wastewater and Nonwastewater Standards Based on Incinerator Ash and Scrubber Water Arbitrary
  - iv. Lack of Incineration Capacity for U105 (2,4-Dinitrotoluene) and U106 (2,6-Dinitrotoluene)
  - v. Operational Requirements on Hazardous Waste Incinerators
  - vi. Data Submittal for NO_x Emissions

C.-. Brominated Compounds
  - i. Brominated Organic Wastewaters are Too Low
  - ii. Brominated Feed Quantities to Incinerator
  - iii. Operational Requirements on Hazardous Waste Incinerators

VOLUME I-N

ISSUE CODE 46: Halogenated Organic, Pharmaceutical, Brominated Organic, Organo-Sulfur Compound, and Organo-Nitrogen Compound Wastes

(Continuation)

D.-. Treatment Methods as Treatment Standards
- i. Use of Indicator Parameters to Evaluate Effectiveness of Treatment
- ii. Oppose Use of Indicator/Surrogate Parameters for Phenolic Wastes
- iii. Linkage of Carbon Adsorption to Oxidation is Too Restrictive
- iv. Biological Treatment Should be Specified as a BDAT Option

E.-. Thermal Treatment/Fuel Substitution
- i. Supports Fuel Substitution as an Alternative BDAT Treatment Method
- ii. Recycling in Cement Kilns as Alternative to Incineration
- iii. Corrective Action Operations

F.-. PQL/Analytical Issues
- i. BDAT Standards Below PQLs
- ii. PQL, MDL Definition
- iii. SW-846 Analytical Methods
- iv. Determination of MDLs
- v. Matrix-Dependent Correction Factors
- vi. EPA Modification of Matrix Factors, Detection Limits, and Procedures
- vii. Data Reliability from EPA Contracts Labs
- viii. BDAT Generic QAPP
- ix. EPA's Use of Non-SW-846 Analytical Methods
- x. Variance Procedure When Compliance Cannot be Measured with Available Analytical Methods

G.-. Miscellaneous Halogenateds
- i. Analytical Methods for U062 (Diallate)
- ii. Analytical Methods for P028 (Benzyl Chloride)
- iii. Nonwastewater Standard for U043 (Vinyl Chloride)
- iv. Rotary Kiln Incineration as BDAT versus Other Types of Incinerators
- v. Linkage of Carbon Adsorption to Oxidation is Too Restrictive
- vi. Biological Treatment Should be Specified as a BDAT Option

VOLUME I-N

ISSUE CODE 46: Halogenated Organic, Pharmaceutical, Brominated Organic, Organo-Sulfur Compound, and Organo-Nitrogen Compound Wastes

(Continuation)

vii. Opposes Regulation of U075 (Dichlorodifluoromethane) and U121 (Trichlorofluoromethane)
viii. Supports Fuel Substitution as an Alternative BDAT Treatment Method
H.-. Organosulfur Compounds
i. Wastewater and Nonwastewater Standards Based on Incinerator Ash and Scrubber Water are Arbitrary
ii. Operational Requirements on Hazardous Waste Incinerators
iii. Data Submittal for Chlorine Dioxide Treatment of Organosulfur Compounds

ISSUE CODE 47: Halogenated Pesticide and Chlorobenzene, Halogenated Phenolic, and Phenolic Wastes

A.-.Phenolics
i. Direct Reuse as BDAT Option for Liquid U052 (Cresol) and U188 (Phenol)
B.-.K085
i. Treatment Standards for PCBs

VOLUME I-O

ISSUE CODE 48: K048-K052 - Petroleum Refining Industry Wastes

A.-. Basis for BDAT Selection
i. Solvent Extraction
a. BP America's Solvent Extraction Unit
b. CF System's Solvent Extraction Unit
c. Resources Conservation Company's Solvent Extraction Unit
d. General Solvent Extraction Comments

VOLUME I-O

ISSUE CODE 48: K048-K052 - Petroleum Refining Industry Wastes (Continuation)

    - ii. Incineration and Solvent Extraction
    - iii. Consideration of Cross Media Effects
    - iv. Commercially Available Technologies
- B.-. BDAT Treatment Standards
    - i. Nonwastewater
        - a. Xylenes and Naphthalene
        - b. Benzo(a)pyrene
        - c. Ethylbenzene and Phenanthrene
        - d. Nickel and Chromium
        - e. General
    - ii. Wastewater
        - a. Cyanide
        - b. General
- C.-. Variability of Wastes Used to Establish BDAT Treatment Standards
- D.-. Treatment Data
    - i. Treatment Data Received During the Comment Period
    - ii. Other Treatment Data Received
    - iii. Requests for Treatment Data
    - iv. Request for Agency Evaluation of the Treatment Data Submitted
- E.-. General Regulatory Comments

ISSUE CODE 49: K036 - Organophosphorous Wastes (Nonwastewaters)

No Comments Were Received for this Waste Code

ISSUE CODE 50: K037

No Comments Were Received for this Waste Code

VOLUME I-P

ISSUE CODE 51: Leachates

A.-. Options
  - i. Support a Separate Waste Code
  - ii. Support a Separate Treatment Standard - Option 2
  - iii. Support Waste Code Carry Through - Option 1
  - iv. Support Promulgation of Both Options

B.-. Definition
  - i. More than one Waste Code
  - ii. More than one Treatability Group

C.-. Dioxin
  - i. Support EPA's Proposed Approach
  - ii. Postpone Dioxin Standards

D.-. Analysis and Monitoring
  - i. EPA's Proposed Approach
  - ii. Indicator Parameters
  - iii. BDAT List as Surrogate List for Unanalyzable Constituents

E.-. Standards
  - i. Standards Based on Industry Data
  - ii. BDAT List Constituents
  - iii. TSD-Specific Multisource Leachate Standards
  - iv. Leachate Treatment Standards Based on Treatability Group
  - v. Multisource Leachate Regulated as a Characteristic Waste
  - vi. Multisource Leachate Standards Based on Technologies
  - vii. Multisource Leachate Wastewater Standards Should Not Be Based on Scrubber Water Data
  - viii. Should Not Specify a Method of Treatment for Multisource Leachate
  - ix. Nonwastewater Standards Should Not Be Based on Incineration
  - x. Use of WAO/Pact System Data for Multisource Leachate Standards
  - xi. Higher Standard for Nickel

F.-. Permitting
  - i. Promulgate Under HSWA as a Minor Permit Modification
  - ii. Oppose Requirement to Reopen Hazardous Waste Disposal Permits

VOLUME I-P

ISSUE CODE 51: Leachates
(Continuation)

G.-. Other
  i. Allow Combination of Leachates to Facilitate Treatment
  ii. Supplemental Notice
  iii. Characterization of Wastes Placed in Pre-RCRA Units
  iv. Clarification of "Contaminated with" Regarding Multisource Leachate and Groundwater
  v. Use of Effluent Guidelines Database
  vi. Delay in Multisource Leachate Rule
  vii. De Minimus Exemptions
  viii. BDAT vs.BAT Effluent Guidelines

VOLUME I-Q

ISSUE CODE 52: U and P Gaseous Wastes

A.-. Thermal and Caustic Solution Destruction as Alternatives to Gas Cylinder Recovery
B.-. Numerical Standards for Gas Wastes in Nongaseous Forms
C.-. Treatment Methods for U115 (Ethylene Oxide)
D.-. Treatment Methods for U115 (Ethylene Oxide) Nonwastewaters

TABLE OF CONTENTS

VOLUME I-A

ISSUE CODE 1: General BDAT Aspects

A. Request for Data
B. Handling of Data
C. Availability of Technology
D. PQLs
E. Wastewaters/Nonwastewaters
F. Grab/Composite Samples
G. Quantification Complications for P and U Wastes
H. Soil and Debris
I. Stabilization
J. Recovery/Recycling Technologies
K. Treatment Standards for Treatability Groups
L. Ammonia Wastes
M. Technology as Treatment Standard
N. Treatment of Residues
O. TCLP vs. EP
P. Analytical Concerns
Q. Treatment Standards for Characteristic Wastes
R. No Land Disposal
S. Wastes with Multiple Characteristics
T. Incineration/Fuel Substitution
U. Transfer of Treatment Standards or Performance Data
V. Definition of K112
W. Treatment Standards for P and U Wastes
X. Treatment Technologies for Metals
Y. Statistical Analysis

Comment Number: 1-A-1

Docket Number: LD12 - 00002

Commenter: CHEMICAL MANUFACTURERS ASSOCIATION

Issue: GENERAL BDAT ASPECTS

Subissue: REQUEST FOR DATA

Comment:

In accordance with Section III.A.i. of the Environmental Protection Agency's (EPA) proposed land disposal restrictions for third third schedules wastes (54 Federal Register 48391; November 22, 1989), the Chemical Manufacturers Association (CMA) hereby requests copies of all additional treatability data submitted during the 45-day comment period for this proposed rule.

Additionally, CMA believes that it has played a constructive role in the evolution of EPA's Land Disposal Restrictions Program. Therefore, we believe that it is reasonable to request that the Agency forward to CMA copies of all additional treatability data it receives during the 45-day comment period. CMA believes that the value of its technical insight on this rulemaking will greatly outweigh any administrative burden incurred as a result of meeting our request.

Please forward these data to me at CMA at the address listed on the first page of this correspondence. If you would like to discuss our request, please call. (202) 887-1270.

Comment Number: 1-A-1
Docket Number: LD12-00001
Commenter: CMA
Issue: General BDAT Aspects
Subissue: Request for Data
Response:

The Agency sent all available data as requested by the commenter

Comment Number: 1-A -2
Docket Number: LD12 - 00037
Commenter: HOLLAND AND HART FOR THE PRECIOUS METAL PRODUCERS
Issue: GENERAL BDAT ASPECTS
Subissue: REQUEST FOR DATA
Comment:

On behalf of the Precious Metals Producers, I am requesting that you provide me with certain data to be submitted to EPA during the comment period on the above-noted proposed rule. Specifically, we are requesting the following data:

1. Additional data on physical and chemical characterization of corrosive wastes, and applicability of chemical deactivation and recovery - Section III.A.4.c. of the preamble.
2. Additional data on treatment of arsenic and selenium - Section III.A.5.b.
3. Additional data on treatment of cadmium - Section III.A.5.d.
4. Additional data on treatment of chromium - Section III.A.5.e.
5. Additional data on treatment of lead - Section III.A.5.f.
6. Additional data on treatment of mercury - Section III.A.5.g.
7. Additional data on treatment of silver - Section III.A.5.h.
8. Additional data on treatment of vanadium - Section III.A.5.i.

Comment Number: 1-A-2

Docket Number: LD12-00037

Commenter: Holland and Hart for the Precious Metal Producers

Issue: General BDAT Aspects

Subissue: Request for Data

Response:

The Agency sent all available data as requested by the commenter. Vanadium data were not submitted during comment period.

Comment Number: 1-A-3
Docket Number: LD12-00038
Commenter: Applied Engineering & Science, Inc.
Issue: General BDAT Aspects
Subissue: Request for Data
Comment:

I hereby request to receive a copy of any additional data submitted regarding the BDAT for K031 nonwastewaters, as well as data relating to K1202 incinerator ash, described in Section III.A.5.b.(2) of the proposed rulemaking, 54 Fed. Reg. 48431-48432 (Nov. 22, 1989).

Comment Number: 1-A-3
Docket Number: LD12-00038
Commenter: Applied Engineering & Science, Inc.
Issue: General BDAT Aspects
Subissue: Request for Data
Response:

The Agency sent all available data as requested by the commenter.

Comment Number: 1-A-4

Docket Number: LD12-00039

Commenter: SWIDLER & BERLIN FOR ALLIED-SIGNAL INC.

Issue: GENERAL BDAT ASPECTS

Subissue: REQUEST FOR DATA

Comment:

In addition, this letter constitutes an official request to be sent any additional data submitted in this docket, concerning the treatment of EP toxic wastes for arsenic (D004) or concerning the treatment of characteristic corrosive hazardous wastes (D002). This request is being made pursuant to Preamble Section III, A, 1, i. The existing data on corrosive wastes was discussed in Preamble Section-III, A, 4, c, and the existing arsenic data was discussed in Preamble Section III, A, 5, b.

Comment Number: 1-A-4

Docket Number: LD12-00039

Commenter: Swidler & Berlin for Allied Signal, Inc.

Issue: General BDAT Aspects

Subissue: Request for Data

Response:

The Agency sent all available data as requested by the commenter.

Comment Number: 1-A-5
Docket Number: LD12-00048
Commenter: COVINGTON & BURLING FOR OWENS-CORNING FIBERGLAS CORP.
Issue: GENERAL BDAT ASPECTS
Subissue: REQUEST FOR DATA
Comment:

Pursuant to Part III.A.1(i) of the Proposed Rule on Land Disposal Restrictions for Third Scheduled Wastes, 54 Fed. Reg. 48372, 48391 (1989). Owens-Corning Fiberglas Corporation hereby requests a copy of all additional data submitted regarding the following items:

1) .Part III.A.4(b) - D001 Waste Treatment Standard

2) Part III.A.4(c) - D002 Waste Treatment Standard

3) Part III.A.5(e) - D007 Waste Treatment Standard

Please send the requested data to:

Susan Parker Bodine
Covington & Burling
1201 Pennsylvania Avenue, N.W.
P.O. Box 7566
Washington, D.C. 20044

Thank you for your cooperation in this matter.

Sincerely yours,

Susan Parker Bodine
Susan Parker Bodine

Comment Number: 1-A-5
Docket Number: LD12-00048
Commenter: Covington & Burling for Owens-Corning Fiberglass Corp
Issue: General BDAT Aspects
Subissue: Request for Data
Response:

The Agency sent all available data as requested by the commenter. Ignitables data were not submitted during comment period.

Comment Number: 1-A-6

Docket Number: LD12-00049

Commenter: RMT Inc.

Issue: General BDAT Aspects

Subissue: Request for Data

Comment:

Could you please send me data submitted during the comment period for the following sections of the November 22, 1989, Federal Register?

- **III.A.5.d (cadmium)**
- **III.A.5.f (lead)**
- **III.A.4.d (reactive wastes)**
- **III.C.2 (treatment below characteristic levels)**
- **III.C.3.L (testing of wastes treated in 90-day tanks or containers)**

Comment Number: 1-A-6
Docket Number: LD12-00049
Commenter: RMT Inc.
Issue: General BDAT Aspects
Subissue: Request for Data
Response:

The Agency sent all available data as requested by the commenter. Data on treatment below characteristic levels and on testing of wastes treated in 90-day tanks or containers were not submitted.

Comment Number: 1-A-7
Docket Number: LD12-00052
Commenter: STRATCOR
Issue: GENERAL BDAT ASPECTS
Subissue: REQUEST FOR DATA
Comment:

This is a request for copies of data received by the EPA in conjunction with RCRA regulations proposed in the Federal Register of November 22, 1989. Procedure for requesting these data are outlined in Section III.A.1.1. of this Federal Register pages 48391-92.

We would like copies of the data received relative to the following sections of the preamble:

III.A.5.j. Vanadium
P119 Ammonium Vanadate
P120 Vanadium Penoxide

III.F. Clarification of "P" and "U" Solid Wastes

Comment Number: 1-A-7
Docket Number: LD12-00052
Commenter: Stratcor
Issue: General BDAT Aspects
Subissue: Request for Data
Response:

Vanadium data were not submitted during comment period.

Comment Number: 1-A-8
Docket Number: LD12-00056
Commenter: EXXON CHEMICAL COMPANY
Issue: GENERAL BDAT ASPECTS
Subissue: REQUEST FOR DATA
Comment:

We hereby request copies of any other data that may be submitted to this docket addressing the issue of BDAT for reactive sulfides. (Sections III.3.g. and III.A.4.d. of the proposal).

Comment Number: 1-A-8
Docket Number: LD12-00056
Commenter: Exxon Chemical Co.
Issue: General BDAT Aspects
Subissue: Request for Data
Response:

The Agency sent all available data as requested by the commenter.

Comment Number: 1-A-9
Docket Number: LD12-00053
Commenter: ATLAS ENVIRONMENTAL INCORPORATED
Issue: GENERAL BDAT ASPECTS
Subissue: REQUEST FOR DATA
Comment:

Atlas Environmental Services is requesting a copy of all additional data and comments addressing the D003 Explosive Waste Subcategory Treatment Standard submitted pursuant to the Land Disposal Restrictions for Third Scheduled Wastes published in the November 22, 1989 Federal Register. We are specifically interested in data and comments addressing the D003 Reactive Waste Explosive Subcategory for the following sections of the proposed rule:

Section II.C	**Characteristic Wastes**
Section III.A.1.g	**General Issues Pertaining to development of Treatment Standards for Characteristic Wastes**
Section III.A.4.d	**Reactive Characteristic Waste**
Section III.B.1	**Determination of Alternative Capacity and Effective Dates for Surface Land-Disposed Wastes for which Treatment Standards are Proposed**
Section III.C.2	**Treatment Below Characteristic Levels**

Comment Number: 1-A-9
Docket Number: LD12-00058
Commenter: Atlas Environmental Services
Issue: General BDAT Aspects
Subissue: Request for Data
Response:

The Agency sent all available data as requested by the commenter.

Comment Number: 1-A-10

Docket Number: LD12-00064

Commenter: U.S. DEPARTMENT OF ENERGY

Issue: GENERAL BDAT ASPECTS

Subissue: REQUEST FOR DATA

Comment:

In addition, DOE would like to take this opportunity to request copies of any additional data received by EPA during the comment period pertaining to the following preamble sections: III.A.4.b.- Ignitable Characteristic Wastes (particularly the Ignitable Reactive Subcategory); III.A.4.c. - Corrosive Characteristic Wastes; III.A.4.d. - Reactive Characteristic Wastes; III.A.5.b. - Arsenic and Selenium; III.A.5.c. - Barium; III.A.5.d. - Cadmium; III.A.5.e. - Chromium; III.A.5.f. - Lead (particularly the "Standards for Radioactive Lead Solids Subcategory"); III.A.5.g. - Mercury (particularly the section on "Standards for Radioactive Wastes Containing Mercury"); III.A.5.h. - Silver; and any new data regarding the treatment of radioactive mixed waste.

Comment Number: 1-A-10
Docket Number: LD12-00064
Commenter: U.S. Department of Energy
Issue: General BDAT Aspects
Subissue: Request for Data
Response:

The Agency sent all available data as requested by the commenter. Ignitables data were not submitted during comment period.

Comment Number: 1-A-11
Docket Number: LD12-00066
Commenter: OLIN CHEMICALS
Issue: GENERAL BDAT ASPECTS
Subissue: REQUEST FOR DATA
Comment:

This letter constitutes a request pursuant to Section III.A.1.i. of the above referenced docket for additional data on the information listed below. The information is listed according to the specific preamble section number and title. The sections requested are:

III.A.2.a.(2)	Incineration for Halogenated Non -wastewaters
III.A.2.b.(1)	K017 and K073 Wastes
III.A.2.b.(4)	U044, U076, U077, U080, U211 Wastes
III.A.2.c.(3)	D012, D013, D015 and D017 Wastes
III.A.2.c.(4)(a)	D012, D015, P004, P051, and P123 Wastes
III.A.2.c.(4)(b)	K085, U037, U070, U071, U072, U127, U183 and U185 Wastes
III.A.2.c.(4)(d)	U060 and U161 Wastes
III.A.2.c.(4)(e)	D013 and U129 Wastes
III.A.2.f.(5)	U075 and U121 Wastes
III.A.2.f.(6)	U095 Waste
III.A.3.b.	Aromatics and Other Hydrocarbons (U019, U220 and U0239)
III.A.3.e.	Oxygenated and Hydrocarbons and Heterocyclics (P003, P005, U002, U031, U112, U140, U154, and U161).
III.A.3.f.(4)(a)	Nitrogen Heterocyclic Compounds (U196)
III.A.3.f.(4)(b)	Amine and Anide Compounds (U007 and U012)

(CONTINUED)

Comment Number: 1-A-11 (CONTINUED)
Docket Number: LD12-00066
Commenter: OLIN Chemicals
Issue: General BDAT Aspects
Subissue: Request for Data
Comment:

III.A.3.f.(4)(d)	Nitriles (U003)
III.A.3.f.(4)(e)	Nitro Compounds (U105 and U106)
III.A.3.g.	Organo-Sulfur Compounds (P116)
III.A.4.b.	Ignitable Characteristic Wastes
III.A.4.c.	Corrosive Characteristic Wastes
III.A.4.d.	Reactive Characteristic Wastes
III.A.4.f.(1)	Incinerable Reactive Organics and Hydrazine Derivates (P081, P068, U086, U098, U099, U109 and U133)
III.A.4.f.(2)	Incinerable Organics (P105 and U135)
III.A.4.f.(3)	Fluorine Compounds (U134)
III.A.5.d.	Cadmium
III.A.5.e.	Chromium
III.A.5.f.	Lead
III.A.5.g.	Mercury
III.A.5.h.	Silver
III.A.5.j.	Vanadium
III.A.6.a.(1)	F006 Wastewaters
III.A.6.g.	K044, K045, K046 and K047
III.A.6.m.	Gases
III.A.7.	Multi Source Leachate
III.E.	Mineral Processing Wastes

(CONTINUED)

Comment Number: 1-A-11 (CONTINUED)
Docket Number: LD12-00066
Commenter: OLIN Chemicals
Issue: General BDAT Aspects
Subissue: Request for Data
Comment:

III.G.	Dilution
III.I.	Storage
III.K.	Waste Analysis Plans
III.L.	90-day Tanks or Containers
V.A.	Discharges Regulated Under Clean Water Act
V.D.	Air Emissions Regulated Under Clean Air Act
V.E.	Clean Up Actions Under CERCLA

Thank you.

Comment Number: 1-A-11
Docket Number: LD12-00066
Commenter: Olin Chemicals
Issue: General BDAT Aspects
Subissue: Request for Data
Response:

The Agency sent all available data as requested by the commenter.

Comment Number: 1-A-12

Docket Number: LD12-00074

Commenter: U.S. SMALL BUSINESS ADMINISTRATION

Issue: GENERAL BDAT ASPECTS

Subissue: REQUEST FOR DATA

Comment:

We request the treatment data relating to: Sections III.A.5.d (cadmium) and III.A.5.f (lead).

Comment Number: 1-A-12
Docket Number: LD12-00074
Commenter: U.S. Small Business Administration
Issue: General BDAT Aspects
Subissue: Request for Data
Response:

The Agency sent all available data as requested by the commenter.

Comment Number: 1-A-13
Docket Number: LD12-00076
Commenter: Ross Environmental Services, Inc.
Issue: General BDAT Aspects
Subissue: Request for Data
Comment:

This letter serves as a formal request by the Hazardous Waste Treatment Council's Land Disposal Restrictions Committee for copies of the following new data submitted to the U.S. EPA within 30 days of public notice of the Land Disposal Restrictions for Third Scheduled Waste Proposed Rule.

6. III.A.5.b. - Treatment Standards for Arsenic bearing waste.
7. III.A.5.g. - Treatment Standards for Mercury.
8. III.A.5.c. - Treatment Standards for Barium.
9. III.A.5.b. - Treatment Standards for Selenium.
10. III.A.5.e. - Treatment Standards for D007.
11. III.A.4.c - Treatment Standards for D002.
12. III.A.4.d. - Treatment Standards for D003.
13. III.A.1.e.- Practical Quantitative Limits on any type of waste mix.
14. III.A.6.b. - F024 and Dioxin Treatment Standards.

Comment Number: 1-A-13
Docket Number: LD12-00076
Commenter: Ross Environmental Services, Inc
Issue: General BDAT Aspects
Subissue: Request for Data
Response:

The Agency sent all available data as requested by the commenter.

Comment Number: 1-A-14
Docket Number: LD12-00210
Commenter: American Standard, Inc.
Issue: General BDAT Aspects
Subissue: Request for Data
Comment:

3. We respectfully request copies of Additional data on treatment of barium- section III.A.5.c.

Comment Number: 1-A-14

Docket Number: LD12-00210

Commenter: American Standard Inc

Issue: General BDAT Aspects

Subissue: Request for Data

Response:

The Agency sent all available data as requested by the commenter.

Comment Number: 1-A-15
Docket Number: LD12-00213
Commenter: Vision-Ease
Issue: General BDAT Aspects
Subissue: Request of Data
Comment:

In addition to the comments, we are also requesting additional data on treatment for Barium (D005) and Lead (D008) wastes. The reference numbers for these requests are Section III.A.5.c. for Barium wastes, and Section III.A.5.e. for Lead wastes.

Comment Number: 1-A-15
Docket Number: LD12-00213
Commenter: Vision-Ease
Issue: General BDAT Aspects
Subissue: Request for Data
Response:

The Agency sent all available data as requested by the commenter.

Comment Number: 1-A-16
Docket Number: LD12-00232
Commenter: U.S. Foundry Manufacturing Corp.
Issue: General BDAT Aspects
Subissue: Request for data
Comment:

I am interested in additional data on the following four sections of your proposed third landban proposal.

1. IIIA-5d Treatment Standards for Cadmium.
2. IIIA-5c Treatment Standards for Chromium
3. IIIA-5f Treatment Standards for lead
4. IIIC Characteristic Wastes.

Comment Number: 1-A-16
Docket Number: LD12-00232
Commenter: U.S. Foundry Manufacturing Corp.
Issue: General BDAT Aspects
Subissue: Request for Data
Response:

The Agency sent all available data as requested by the commenter.

Comment Number: I-A - 17
Docket Number: LD12 - 00252
Commenter: Resource Consultants
Issue: General BDAT Aspects
Subissue: Request for Data.
Comment:

Please send copies of any additional data with regard to the following:

(a) "Additional data on treatment of barium-Section III.A.5.c."
(b) "Additional data on treatment of cadmium-Section III.A.5.d."
(c) "Additional data on treatment of lead-Section III.A.5.e."

Comment Number: 1-A-17

Docket Number: LD12-00252

Commenter: Resource Consultants

Issue: General BDAT Aspects

Subissue: Request for Data

Response:

The Agency sent all available data as requested by the commenter.

Comment Number: 1- A-18

Docket Number: LD12-00256

Commenter: FMC Corporation

Issue: General BDAT Aspects

Subissue: Request for Data

Comment:

FMC Corporation respectfully requests a copy of any additional data submitted to the Docket with respect to vitrification of arsenic wastes (D004); and specifically, arsenic sulfide wastes. Such data will probably be submitted with reference to section III.A.5.6.(2)(a).

Comment Number: 1-A-18
Docket Number: LD12-00256
Commenter: FMC Corporation
Issue: General BDAT Aspects
Subissue: Request for Data
Response:

The Agency sent all available data as requested by the commenter.

Comment Number: 1-A-19
Docket Number: LD12-00277
Commenter: Bogle & Gates
Issue: General BDAT Aspects
Subissue: Request for Data
Comment:

Please send additional data on treatment of cadimium - Section III.A.5.d and additional data on the treatment of lead - Section III.A.5.e to me at the above address.

Comment Number: 1-A-19
Docket Number: LD12-00277
Commenter: Bogle & Gates
Issue: General BDAT Aspects
Subissue: Request for Data
Response:

The Agency sent all available data as requested by the commenter.

Comment Number: 1- A-20

Docket Number: LD12- L0003

Commenter: RMT, Inc.

Issue: General BDAT Aspests

Subissue: Request for Data

Comment:

Could you please send me data submitted during the comment period for the following sections of the November 22, 1989, Federal Register?

- III.A.5.d (cadmium)
- III.A.5.f (lead)
- III.A.4-d (reactive wastes)
- III.C.2 (treatment below characteristic levels)
- III.C.3.L (testing of wastes treated in 90-day tanks or containers)

Comment Number: 1-A-20
Docket Number: LD12-L0003
Commenter: RMT, Inc.
Issue: General BDAT Aspects
Subissue: Request for Data
Response:

The Agency sent all available data as requested by the commenter. Data on treatment below characteristic levels and on testing of wastes treated in 90-day tanks or containers were not submitted.

Comment Number: 1 - A - 21
Docket Number: LD12 - L0011
Commenter: Reactive Waste Services, Inc.
Issue: General BDAT Aspects
Subissue: Request for Data
Comment:

Reactive Waste Services, Inc. has submitted a comment to the above referenced docket. Our comment addressed the D003 Explosive Waste Subcategory Treatment Standard set forth in the November 22, 1989 Federal Register notice titled "Land Disposal Restrictions for Third Third Scheduled Wastes." We hereby request a copy of all other comments and data submitted concerning the matters identified below, in order that we may respond to those comments and data and provide any appropriate clarification. The subjects of interest are the following matters within the D003 Reactive Waste Explosive Subcategory:

Section	Title
II.C	Characteristic Wastes
III.A.1.g	General Issues Pertaining to Development of Treatment Standards for Characteristic Wastes
III.A.4.d	Reactive Characteristic Waste
III.B.1	Determination of Alternative Capacity and Effective Dates for Surface Land Disposed Wastes for which Treatment Standards are Proposed
III.C.2	Treatment Below Characteristic Levels

Comment Number: 1-A-21
Docket Number: LD12-L0011
Commenter: Reactive Waste Services, Inc
Issue: General BDAT Aspects
Subissue: Request for Data
Response:

The Agency sent all available data as requested by the commenter.

Comment Number: 1-A-22
Docket Number: LD12-00004.
Commenter: American Chrome & Chemicals, Inc.
Issue: General BDAT Aspects
Subissue: Request for data
Comment:

As specified in the Wednesday November 22, 1989 publication in the Federal Register of the Proposed Rule for Land Disposal Restrictions For Third Scheduled Wastes, I am requesting additional data on III. A.5.e. - Chromium Stabilization Data.

Comment Number: 1-A-22
Docket Number: LD12-00004
Commenter: American Chrome & Chemicals, Inc
Issue: General BDAT Aspects
Subissue: Request for Data
Response:

The Agency sent all available data as requested by the commenter.

Comment Number: 1-A-23
Docket Number: LD12-00009
Commenter: Morgan, Lewis & Bockius (Pfizer)
Issue: General BDAT Aspects
Subissue: Request for data
Comment:

On behalf of Pfizer, Inc., I request that any data submitted to EPA pertaining to section III.A.6.c - "Wastes from Inorganic Pigment Production" of the preamble to the Third-Third Land Disposal Restrictions Rule be sent to me. This section of the rule addresses treatment standards for the listed hazardous wastes, K002-K008.

Comment Number: 1-A-23
Docket Number: LD12-00009
Commenter: Morgan Lewis & Bockus (Pfizer)
Issue: General BDAT Aspects
Subissue: Request for Data
Response:

Data on pigments were not submitted to the Agency

Comment Number: 1-A-24
Docket Number: LD12-00010
Commenter: Morgan, Lewis & Brooks (BP America
Issue: General BDAT Aspects
Subissue: Request for data.
Comment:

On behalf of BP America, Inc., I request that any data submitted to EPA pertaining to section III.A.6.n - "Revision of Petroleum Refining Waste" of the preamble to the Third-Third Land Disposal Restrictions Rule be sent to me. This section of the rule addresses treatment standards for the listed hazardous wastes, K048-K052.

Comment Number: 1-A-24
Docket Number: LD12-00010
Commenter: Morgan Lewis, & Brooks (BP America)
Issue: General BDAT Aspects
Subissue: Request for Data
Response:

The Agency sent all available data as requested by the commenter.

Comment Number: 1-A-25
Docket Number: LD12-00011
Commenter: Morgan, Lewis & Brooks (Glass Packag.)
Issue: General BDAT Aspects
Subissue: Request for data
Comment:

On behalf of Glass Packaging Institute, I request that any data submitted to EPA pertaining to section III.A.5.d - "Cadmium" and III.A.5.e "Chromium" wastes of the preamble to the Third-Third Land Disposal Restrictions Rule be sent to me. This section of the rule addresses treatment standards for the characteristic hazardous wastes, D006 and D007.

Comment Number: 1-A-25
Docket Number: LD12-00011
Commenter: Morgan, Lewis, & Brooks (Glass Packaging)
Issue: General BDAT Aspects
Subissue: Request for Data
Response:

The Agency sent all available data as requested by the commenter.

Comment Number: 1-A-26

Docket Number: LD12-00013

Commenter: Andrews & Kurth (Sec. lead smelters)

Issue: General BDAT Aspects

Subissue: Request for data

Comment:

On behalf of the Secondary Lead Smelters Association, Inc. ("SLSA"), we hereby request copies of all additional waste characterization and treatment data submitted to EPA regarding the following preamble sections of the November 22, 1989 land disposal restrictions Federal Register notice (54 Fed. Reg 48372 (1989).):

MONICA 1) section III.A.5.f. - lead;
ANA [2) section III.A.5.d. - cadmium;
3) section III.A.5.e. - chromium; and
LAURA 4) section III.A.5.c. - arsenic.

It is our understanding that the SLSA will have twenty-one (21) days from the date that the additional data is mailed to us to submit comments to EPA regarding this data.

Comment Number: 1-A-26
Docket Number: LD12-00013
Commenter: Andrews & Kurth (Secondary Lead Smelters)
Issue: General BDAT Aspects
Subissue: Request for Data
Response:

The Agency sent all available data as requested by the commenter.

Comment Number: 1-A-27

Docket Number: LD12-00016.

Commenter: NACUBO

Issue: General BDAT Aspects

Subissue: Request for data

Comment:

Section III.A.9. "Treatment Standards for Lab Packs"
Section III.D. "Mixed Hazardous/Radioactive Wastes"
Section III. I. "Storage Prohibition"

Comment Number: 1-A-27

Docket Number: LD12-00016

Commenter: NACUBO

Issue: General BDAT Aspects

Subissue: Request for Data

Response:

Data on lab packs, storage prohibition, and radioactive wastes were not submitted to the Agency

Comment Number: 1-A-28
Docket Number: LD12-00018
Commenter: Newman & Holtzinger, P.C.
Issue: General BDAT Aspects
Subissue: Request for data
Comment:

Pursuant to the requirements set forth at 54 Fed. Reg. 48,392, we specifically request a copy of all additional data submissions that pertain to the following section numbers, titles, and specified issues of concern.

(1) III.A.3.e -- Oxygenated Hydrocarbons and Heterocyclics; treatment data relating to methyl methacrylate (U162) wastewater and nonwastewater.

(2) III.A.4.c -- Corrosive Characteristic Wastes; treatment and capacity data relating to the insoluble salts treatment standard.

(3) III.A.4.d -- Reactive Characteristic Wastes and III.A.6.a -- Cyanide Wastes; treatment data relating to cyanide wastewaters.

(4) III.A.5.e -- Chromium; treatment data relating to D007 wastewaters.

(5) III.A.5.j -- Vanadium; treatment data relating to P119 and P120 wastewaters and nonwastewaters.

(7) III.A.9 -- Treatment Standards for Lab Packs; all treatment data.

(8) III.D -- Mixed (Hazardous/Radioactive) Wastes; all treatment and capacity data.

Comment Number: 1-A-28
Docket Number: LD12-00018
Commenter: Newman & Holtzinger, PC
Issue: General BDAT Aspects
Subissue: Request for Data
Response:

The Agency sent all available data as requested by the commenter. Data on oxygenated hydrocarbons, vanadium and mixed wastes were not submitted to the Agency.

Comment Number: 1-A-29
Docket Number: LD12-00021
Commenter: Fermenta ASC
Issue: General BDAT Aspects
Subissue: Request for data.
Comment:

This is a request to receive copies of any additional data being submitted to EPA pertaining to the following sections:

III.A.5.b - Arsenic Waste Treatment Data

Comment Number: 1-A-29
Docket Number: LD12-00021
Commenter: Fermenta
Issue: General BDAT Aspects
Subissue: Request for Data
Response:

The Agency sent all available data as requested by the commenter.

Comment Number: 1-A-30
Docket Number: LD12-00026.
Commenter: HWTC
Issue: General BDAT Aspects
Subissue: Request for data
Comment:

This letter serves as a formal request by the Hazardous Waste Treatment Council's Land Disposal Restrictions Committee for copies of the following new data submitted to the U.S. EPA within 30 days of Public Notice of the Land Disposal Restrictions for Third Scheduled Wastes Proposed Rule.

1. III.B.1.a,b,c – Capacity variance data for D001 solids and sludges.
2. III.B.1.a,b,c – Capacity variance data for K048-K052.
3. III.B.1.a,b,c – Capacity variance data for D004 arsenic vitrification.
4. III.B.1.a,b,c – Capacity variance data for D009 mercury retorting.
5. III.B.1.a,b,c – Capacity variance data for D010 selenium vitrification.
6. III.A.5.o – Treatment standards for arsenic bearing wastes.
7. III.A.5.g – Treatment standards for mercury.
8. III.A.5.c – Treatment standards for barium.
9. III.A.5.b – Treatment standards for selenium.
10. III.A.5.e – Treatment standards for D007.
11. III.A.4.c – Treatment standards for D002.
12. III.A.4.d – Treatment standards for D003, cyanides, sulfides.
13. III.A.1.e – Practical quantitative limits on any type of waste matrix.
14. III.A.6.b – F024 and dioxin treatment standards.
15. III.A.6.n – Treatment standard data for K048-K052.
16. III.A.9 – Treatment standards for lab packs.

In addition to these specific items, we also request copies of any data in general submitted regarding any treatment standards for any waste in the third-third rule, or any capacity data.

Comment Number: 1-A-30

Docket Number: LD12-00026

Commenter: The HWTC

Issue: General BDAT Aspects

Subissue: Request for Data

Response:

The Agency sent all available data as requested by the commenter. Data on capacity variances, F024, and lab packs were not submitted to the Agency

Comment Number: 1-A-31

Docket Number: LD12-00030

Commenter: Frank, Bernstein, Conaway & Goldman (Allied)

Issue: General BDAT Aspects

Subissue: Request for Data

Comment:

On behalf of our client, Allied-Signal Inc., we hereby request copies of all additional data submitted with respect to the following sections of the third-third land disposal restrictions proposed rule:

- Section III.A.5.e (Proposed Treatment Standards for Chromium Wastes)
- Section III.A.8 (Applicability of Treatment Standards to Soil and Debris)
- Section III.B.3 (Contaminated Soil and Debris Capacity Variance)
- Section III.E (Applicability of Proposed Rule to Mineral Processing Wastes)
- Section III.G (Determining When Dilution Is Permissible)
- Section III.I (Storage Prohibition)

Comment Number: 1-A-31
Docket Number: LD12-00030
Commenter: Frank, Bernstein, Conaway & Goldman (Allied Signal)
Issue: General BDAT Aspects
Subissue: Request for Data
Response:

The Agency sent all available data as requested by the commenter. Of all data requested by the commenter, only data on chromium were submitted to the Agency.

Comment Number: 1-A-32
Docket Number: LD12-00036
Commenter: RSR Corporation
Issue: General BDAT Aspects
Subissue: Request for data
Comment:

In compliance with EPA's instructions set forth at 54 Fed. Reg. 48391-92 and 48437, RSR requests copies of any data submitted during the public comment period relating to Sections III. A. 5. e. and f. (Proposed Treatment Standards for Metal Wastes -- Chromium and Lead, respectively).

Comment Number: 1-A-32
Docket Number: LD12-00036
Commenter: RSR Corporation
Issue: General BDAT Aspects
Subissue: Request for Data
Response:

The Agency sent all available data as requested by the commenter.

Comment Number: 1-A-33

Docket Number: LD12-00042.

Commenter: American Foundrymen's Society

Issue: General BDAT Aspects

Subissue: Request for data

Comment:

In accordance with the procedure outlined at page 48392 of the proposal, we request that the Agency promptly mail to us a copy of all submissions which are made with respect to lead, cadmium, and chromium, including but not limited to the proposed treatment standards and other aspects of sections III.A.5.f, III.A.5.d, and III.A.5.e, respectively.

Comment Number: 1-A-33
Docket Number: LD12-00042
Commenter: American Foundrymen 's Society
Issue: General BDAT Aspects
Subissue: Request for Data
Response:

The Agency sent all available data as requested by the commenter.

Comment Number: 1-A-34
Docket Number: L012-00095
Commenter: Am. Paper Inst. / Nat. Forest Prod. Assoc.
Issue: General BDAT Aspects
Subissue: Request for Data
Comment:

In addition, pursuant to EPA's preamble discussion at 54 Fed. Reg. 48392, API/NFPA request all additional data submitted to the docket during the public comment period about the following treatment standards:

1. Preamble Section III.A.4.c.(1)--Proposed treatment standards for corrosive characteristic wastes, D002 acid and alkaline subcategory, including, without limitation, all data concerning neutralization to insoluble salts and dilution as a treatment technique.

2. Preamble Section III.A.4.d. and d.(2)--Proposed treatment standards for reactive characteristic wastes and reactive sulfides subcategory including, without limitation, all data concerning (i) the physical and chemical properties of these wastes, (ii) treatment methods comprising alkaline chlorination, chemical oxidation, or incineration followed by precipitation to insoluble sulfates; (iii) other treatment technologies for these wastes, and; (iv) EPA's proposed 500 mg/kg toxic gas generation threshold for the reactive sulfides subcategory.

Comment Number: 1-A-34

Docket Number: LD12-00095

Commenter: API/NFPA

Issue: General BDAT Aspects

Subissue: Request for Data

Response:

The Agency sent all available data as requested by the commenter.

Comment Number: 1-B-1
Docket Number: LD12-00001
Commenter: CHEMICAL MANUFACTURERS ASSOCIATION
Issue: GENERAL BDAT ASPECTS
Subissue: HANDLING OF DATA
Comment:

CMA is a nonprofit trade association whose member companies represent more than ninety percent of the productive capacity for basic industrial chemicals in this country. In the course of manufacturing these chemicals, which make possible a wide-variety of beneficial products, CMA member companies generate and manage hazardous waste. They are, therefore, directly and materially affected by EPA's regulations implementing the Resource Conservation and Recovery Act (RCRA, as amended), including the land disposal restrictions (LDR). Accordingly, CMA is vitally interested in the Agency's current (11/22/89) proposal and, in the past, has commented on virtually every rulemaking affecting EPA's hazardous waste regulatory program.

In the current proposal, the Agency indicates that it is making "every effort" to develop treatment standards for all of the wastes scheduled for or deferred to the third third LDR rulemaking. EPA is anticipating that commenters will submit additional treatability data to assist the Agency in developing or refining LDR treatment standards. CMA is encouraged that the Agency will consider additional data, and agrees that such data should be subject to public notice and comment. CMA also believes that it is appropriate, in light of the essentially abbreviated comment period for this gargantuan proposal, for the Agency to send copies of additional data it receives directly to interested parties requesting it. Such a service will enable interested parties to comment on the additional treatability data in a timely manner.

Comment Number: 1-B-1
Docket Number: LD12-00001
Commenter: CMA
Issue: General BDAT Aspects
Subissue: Handling of Data
Response:

The Agency acknowledges the commenter's opinion.

1

Comment Number: 1-B.2
Docket Number: LD12-00168
Commenter: American Petroleum Institute
Issue: General BDAT Aspects
Subissue: Handling of Data.
Comment:

III. A.1.i. - Procedures for Requesting Additional Data on Specific Treatment Standards

In addition to limiting the overall comment period for this proposal to only 45 days, EPA has imposed a 30 day deadline (December 22, 1989) for the submission of any new treatment data that commenters believe should be considered in the development of final treatment standards.[16] API has already informed EPA by separate letter that both of those deadlines are unrealistic and unreasonable given the enormous scope of, and extraordinary number of new issues raised by, this proposal. (Letter dated December 14, 1989 from Dr. Terry F. Yosie, API, to S. Lowrance, EPA.) Under these circumstances, the comment periods provided by EPA do not afford an adequate or reasonable opportunity for meaningful public participation in this vitally important rulemaking, as required by the Administrative Procedure Act (5 U.S.C. section 553(c)). See also RCRA section 7004(b)(1) (public participation in developing any RCRA regulation must be encouraged and assisted by EPA). Thus, API has requested that EPA extend the general comment period by an additional 30 days, the minimal amount of time necessary to permit development of data and other comments to ensure adequate public participation.

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[16] An additional period of only 21 days, at most, is provided for other commenters to respond to any new treatment data submitted.

2

Comment Number: 1-B-2 continued
Docket Number: LD12-00168
Commenter: American Petroleum Institute
Issue: General BDAT Aspects
Subissue: Handling of Data
Comment:

EPA bases its decision to drastically curtail these comment periods in part on the May 1990 statutory deadline for promulgating standards for all remaining listed wastes (the "hard hammer"). API understands EPA's concern for meeting that deadline, as well as the complexity and difficulty of the tasks EPA must perform before meeting that deadline. However, compliance with that statutory provision does not excuse EPA from its other statutory duty to provide an adequate opportunity for effective public participation in this rulemaking, which in itself is essential to EPA's duty to engage in reasoned decisionmaking. It would, of course, be counterproductive to publish a final rule by May 1990 which, because of an inadequate opportunity for public comment or an inadequate record, may not survive judicial review.

Comment Number: 1-B.2 continued
Docket Number: LD12-00168
Commenter: American Petroleum Institute
Issue: General BDAT Aspects
Subissue: Handling of Data
Comment:

Further, the May 1990 statutory deadline does not compel EPA to finalize all parts of this rulemaking by that time. Certain important portions of this rule are not affected by the land disposal prohibition "hard hammer" associated with that deadline. For example, because EPA has long-since promulgated final treatment standards for listed refinery wastes (K048-K052), the "hard hammer" would not apply to land disposal of those wastes and there is no need for EPA to finalize its proposed revisions to those standards by May 1990. Thus, API urges EPA to extend or reopen the comment period on that aspect of the proposal to allow meaningful public participation and reasoned consideration by EPA of all relevant data on K048-K052 waste treatment.[17]

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[17] Indeed, under a national capacity variance previously granted by EPA, land disposal restrictions for these wastes do not take effect until August 8, 1990. Although API urges EPA to allow additional comment on treatment standards for those wastes, API notes that it filed a petition with EPA in October 1989 requesting EPA to revise several of the treatment standards for K048-K052 wastes on the ground that it may not be technically feasible to achieve such standards. API urges EPA to review and grant that petition as expeditiously as possible.

Comment Number: 1-B-2 continued
Docket Number: L012 - 00168
Commenter: American Petroleum Institute
Issue: General BDAT Aspects
Subissue: Handling of Data
Comment:

Similarly, as discussed in part III. A.1.g of these comments, the "hard hammer" does not apply to characteristic wastes. Thus, that part of the proposal -- which raises many new issues not previously known to the industry or fully considered by EPA -- need not be finalized by May 1990 and EPA should also extend or reopen the comment period on those issues.

Finally, EPA justifies the even shorter (30 day) comment period for submission of new treatment data on the ground that industry "could have" known since 1984 that such data would be needed. That claim is neither realistic under the circumstances nor legally adequate. First, EPA's claim is oversimplified. The fact is that the many industries potentially affected by this rule could not have known or anticipated exactly what kind of specific treatment data would be relevant to this rulemaking without first seeing the specific issues raised by the proposal. This is especially true in light of the changes and "clarifications" in EPA's positions on many treatment-related issues that have only been announced recently. For example, EPA never suggested setting treatment standards for characteristic wastes below characteristic levels until this proposal. See part III. C below. Nor did EPA suggest that the May 1990 "hard hammer" applies to characteristic wastes until this year.

Comment Number: 1-B-2 continued
Docket Number: LD12-00168
Commenter: American Petroleum Institute
Issue: General BDAT Aspects
Subissue: Handling of Data
Comment:

Further, EPA has suggested (vaguely in some cases) modifications and clarifications in areas such as spills, disposal of contaminated media and permissible vs. impermissible dilution, all of which raise treatment-related issues that may require development of new data.[18] Moreover, affected industries cannot be expected to commit major resources to the collection of new data which may or may not ever be needed and which may be rendered irrelevant by changes in EPA's positions or other circumstances. Such development efforts ideally require long-term planning, commitment of resources, and a fixed target to work with.

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[18] Indeed, the many changes and "clarifications" raised in this proposal make the January 8 deadline for all comments all the more unreasonable. If EPA felt compelled to so abbreviate the comment period, it should have deferred such new issues until a later rulemaking.

Comment Number: 1-B-2 continued
Docket Number: LD12-00168
Commenter: American Petroleum Institute
Issue: General BDAT Aspects
Subissue: Handling of Data
Comment:

In any event, in this rulemaking the initial burden of producing an adequate factual record, which includes adequate treatment data, is on EPA. The Agency cannot simply shift this burden to the affected industries by vaguely asserting that they "could have" anticipated EPA's needs. In the end, if EPA lacks adequate, relevant data to support a final rule, it must allow more time for the collection and consideration of such data.

Finally, as required by EPA (54 Fed. Reg. 48392), API has requested by separate letter that EPA provide any new treatment data on certain specified issues for which API may want to file supplemental comments. Letter dated December 14, 1989 from Dr. Terry F. Yosie, API, to Sylvia Lowrance, EPA.

Comment Number: 1-B-2
Docket Number: LD12-00168
Commenter: American Petroleum Institute
Issue: General BDAT Aspects
Subissue: Handling of Data
Response:

The Agency also 1) shared data, held meetings, circulated draft rules, announced decisions, and provided the proposed rule before Federal Register publication to API and every other interested party; and 2) met with API many times during and after the public comment period.

Comment Number: 1-B-3
Docket Number: LD12-00240
Commenter: Amoco Corporation
Issue: General BDAT Aspects
Subissue: Handling of Data
Comment:

Section III.A.1.f.(1)

EPA must compensate for the limitations in its data base when setting standards based on a small number of data sets from a single facility. As data provided to the Agency in the aforementioned submission by Amoco (and in API's petition for review of K048-K052 standards) demonstrates, one short-term evaluation for one facility is likely to be unrepresentative of that facility, in some respects, let alone the entire industry, when a complex process such as refining is involved. Differences in crude slates, process configurations, etc., can result in widely different wastes and treatability.

Section III.A.1.i.

Amoco is willing to work with the Agency to gather credible data to be used as the basis for technically sound regulation. However, adequate time for data collection was not allowed in light of major changes in EPA policy which change the amount or type of data required. In particular, EPA cannot expect industry to anticipate the recent major changes in EPA interpretations which have drastically increased the scope of this proposal, such as: 1) permissible dilution; 2) point of waste generation; and 3) authority to establish treatment standards for characteristic wastes below the characteristic. All of these changes have profoundly increased the amount of data needed.

Comment Number: 1-B-3
Docket Number: LD12-00240
Commenter: Amoco Corporation
Issue: General BDAT Aspects
Subissue: Handling of Data
Response:

The Agency acknowledges the commenter's opinion. The Agency received data submitted by the public for various waste codes. As established in the proposed rule, the Agency sent these data to the commenters who were interested in reviewing the new information submitted. In some cases, the Agency received comments about the data sent; these additional comments were used, in several cases, in the development of the standards.

Comment Number: 1-C-1
Docket Number: LD12-00172
Commenter: Hazardous Waste Treatment Council
Issue: General BDAT Aspects
Subissue: Availability of Technology
Comment:

In this proposed rule EPA has specified two technologies, vitrification and retorting, that are not currently commercially unavailable. The vitrification technology was based on University studies. It is important that EPA base BDAT decisions on technology that is commercially available on a full scale basis. This is to prevent needless capacity variances, when suitable technology is practiced currently for the treatment of wastes. By specifying obscure technology and granting capacity variances, EPA is not taking steps to phase out the land disposal of wastes as rapidly as is possible. Congress specified the terms "demonstrated available" in BDAT to move as quickly as possible away from land disposal. By over focusing on the term "best" in BDAT EPA is delaying the restrictions on land disposal of wastes.

Comment Number: 1-C-1
Docket Number: LD12-00172
Commenter: The HWTC
Issue: General BDAT Aspects
Subissue: Availability of Technology
Response:

EPA has criteria that identifies technologies as "available" that can be found in the November 7, 1986 solvents and dioxins final rule (51FR 40572) and in the document entitled "Methodology for Developing Best Demonstrated Available Technology (BDAT) Treatment Standards." EPA believes vitrification and retorting meet the criteria as available treatment technologies, as explained below.

With respect to vitrification, the Agency has received additional information on the availability of equipment. Penberthy Electromelt, a manufacturer of glass furnaces has indicated the ability to supply vitrification equipment to customers within a time frame of less than six months. Rhone Poulenc has indicated that they are willing to make their patented technology available to other firms for use. The Agency developed numerical standards for D004 wastes based on vitrification technology however, facilities are free to use other technologies to meet the numerical standards.

EPA believes that vitrification is also "demonstrated" to treat arsenic wastes because it has been demonstrated to treat wastes that are more difficult to treat (i.e., high-level radioactive wastes.) The radioactive wastes are believed to be more difficult to treat because of the extreme concerns for leaching and air emissions associated with the radioactive portion of the waste. Therefore, the Agency has concluded that vitrification is BDAT for arsenic-containing wastes and high-level radioactive mixed wastes.

With respect to retorting, several technologies exist for the removal and recovery of mercury from both solid and liquid effluents. In the treatment of mercury-containing waste materials, one widely used method is to heat the mercury-containing waste in a retort to recover the metallic mercury. (See Metal and Inorganic Waste Reclaiming Encyclopedia, 1980.)

There are several processes developed for retorting mercury wastes. They are, G. Generine U.S. Patent 4,087,276; May 2. 1978 assigned to ANIC SpA, Italy. Another process developed by W. M. Loo; U.S. Patent 4,149,879; April 17, 1979; assigned to Olin Corporation is being used to treat mercury nonwastewater sludge. (See Metal and Inorganic Waste Reclaiming Encyclopedia, 1980.)

Comment Number: 1-C-1
Docket Number: LD12-00172
Commenter: The HWTC
Issue: General BDAT Aspects
Subissue: Availability of Technology
Response: (Continuation)

Thermal ore processing technology is used to recover elemental mercury from mercury ores at McDermitt Mines. Similar technologies (retorting and roasting) are used or have been used at several chlor-alkali facilities in the U.S. and in Europe to process mercury wastewater treatment sludge. Therefore, thermal recovery (retorting) of mercury is available and thus has been determined to be BDAT for inorganic mercury nonwastewaters. Retorting also has been demonstrated for K071 nonwastewaters and other nonwastewaters in the high mercury category (See Final Mercury Background Document, 1990) and is commercially available.

Comment Number: 1-D-1
Docket Number: LD12-00110
Commenter: Thermal KEM/ Cyano KEM
Issue: General [illegible] BDAT Aspects
Subissue: PQLs
Comment:

- **PQL VS. BDAT**

The HWTC has submitted a comprehensive report on PQLs achievable for incinerator ash matrices. This report titled "Method Detection Limits and Practical Quantitation Limits for Incinerator Ash Matrices - Interlaboratory Study" was submitted on December 22, 1989 in time for the deadline in the proposed rule for data comments. This report covers studies performed by six member incineration firms, in cooperation with and under oversight provided by EPA's Methods Branch. ThermalKEM was one of the participants in this study.

The data in this report indicates that for approximately 60% of the BDAT standards promulgated or proposed to date, PQLs are higher than the level set as the BDAT standard. We urge EPA to consider the findings of this study in setting the final treatment standards for third thirds wastes.

EPA provides a quote from SW846 in the preamble to the third thirds rule (54FR48385) -

> **"Sample PQLs are highly matrix-dependent. The PQLs listed herein are provided for guidance and may not always be achievable" (SW846 - September 1986, Table 2, p. 8250-5).**

The PQLs provided in SW846 are based on "method detection limits" in reagent water multiplied by a matrix dependent factor. This matrix dependent factors have only been determined for soil and wastewater matrices. EPA further points out that -

> **"the PQLs listed in SW846 are not always achievable for constituents as measured in untreated wastes" (54FR48385).**

EPA however, has not determined PQLs for untreated waste, only soil and wastewater. EPA further only qualitatively argues in the Third Thirds proposed rule preamble that they expect PQLs for incinerator ash to be substantially lower than those for untreated waste.

2

Comment Number: 1-D-1 continued
Docket Number: LD12-00110
Commenter: Thermal KEM/ Cyano KEM
Issue: General BDAT Aspects
Subissue: PQLs
Comment:

In making this statement, EPA is assuming that the only matrix interference effect is that arising from some major organic component or components in the untreated waste. However, as proven by the HWTC interlaboratory study, there are major physical factors that affect the PQLs for incinerator ash, making these higher for many cases than those PQLs achievable for untreated waste. These factors are discussed in the separate report submitted by the HWTC, and include the absorption effects of the activated carbon and silicates in the incinerator ash, and the surface features of incinerator ash which include a large number of active sites for absorption effects. These effects make incinerator ash matrices vastly different than soil or untreated waste matrices.

The main point is that EPA has not determined PQLs for any waste matrices, including incinerator ash. HWTC member companies, at great expense, have completed a detailed interlaboratory PQL study specifically on incinerator ash matrices. This study was done in full cooperation with the EPA Methods Branch, with guidance and support provided by David Friedman and Barry Lesnick. We request that the Waste Treatment Branch of EPA set final treatment standards for Third Third waste constituents consistent with the true PQLs for incinerator ash determined by the HWTC member companies.

We feel that any method used to analyze a constituent for compliance with any regulatory limit must be properly developed, validated and incorporated into written procedures approved by EPA. This is because if enforcement of these regulatory limits is to be effective, the methods used to determine compliance must be well developed, validated and promulgated as part of EPA approved methodology in order to be technically defensible in court. Therefore, any methods used for analysis of treatment residuals must be based on SW846 methods, or other EPA approved methods such as the APHA "Standard Methods for the Examination of Water and Wastewater." Not only is this necessary for enforcement proceedings but is also important in preventing a gaping loophole in the Part 268 standards where any method not properly developed or executed is used to show compliance, where compliance has really not been achieved. A poorly responding method, not based on SW846, could be used to argue compliance for example.

Comment Number: 1-D-1 continued
Docket Number: LD12-00110
Commenter: Thermal KEM / CyanoKEM
Issue: General BDAT Aspects
Subissue: PQLs
Comment:

If no EPA approved method exists that has been properly validated, then no concentration based treatment standard can be set for that constituent since it is not analyzable for compliance purposes. In such a case, either a specified treatment methodology standard should be set, a surrogate compound specified as a standard if an EPA method exists, or the other regulated constituents for which treatment standards have been set can serve as indicators of performance. A good example is the method standard in F001-F005 waste. No EPA method exists for methanol and all laboratories are having difficulty in detecting methanol in incinerator ash at the levels of regulatory concern. This was confirmed by the HWTC PQL study. EPA should therefore withdraw and reserve the standard for methanol until a suitable method is developed and properly validated. We understand that EPA's Methods Branch is currently researching this problem recognized by the Agency. Reserving the methanol standard in F001-F005 waste will cause no environmental risk, as there are 24 other BDAT constituents set as treatment standards for this waste that can serve as indicators of incinerator performance, and the effectiveness of treatment. If the other 24 BDAT constituents are destroyed to the required concentration based BDAT levels, then methanol has also surely been destroyed to the maximum extent achievable by BDAT.

Calibration is important to ensuring that the measurements being made are correct, and calibration standards must be available readily. We agree with EPA that difficulties in obtaining standards and in verifying purity of standards is sufficient cause not to establish concentration based treatment standards.

In the course of performing the interlaboratory study on incinerator ash, the HWTC member companies ran into problems obtaining the following standards.

Benzo (a) pyrene
Benzo (g,h,i) perylene
Benzo (k) fluoranthene
1,2:7,8 - Dibenzo (a,i) pyrene
2-Chloro-1,3-Butadiene

Comment Number: 1 - D-1 continued
Docket Number: LD12 - 00110
Commenter: Thermal KEM / Cyano KEM
Issue: General BDAT Aspects
Subissue: PQLs
Comment:

These standards could not even be provided by EPA-RTP or EMSL, who provided all of the other traceable standards for the interlaboratory study. Some of these standards are extremely costly, in excess of $4000 for the quantities needed for calibration. For these compounds, we feel that concentration based BDAT standards must not be set, only technology specific BDAT standards are practical.

Finally, we strongly disagree with the statement made in the preamble to the Third Thirds proposed rule on page 48388, concerning SW846 not requiring that calibration standards be available for every compound analyzed. Every SW846 method requires the use of a calibration standard. Further, for the compounds in question here, no alternate surrogate has been offered by EPA in SW846 or in any other publication. Therefore, the lack of calibration standards for the above named compounds is cause for not promulgating numeric - concentration based treatment standards for these constituents.

Likewise, several problematic constituents are discussed in the HWTC interlaboratory study - Tables 1.0 and 2.0 in Section V - for which reliable analytical methods are not available. These problematic constituents include water soluble constituents like alcohols, 1,4-Dioxane, acrolein cyclohexanone, and acetonitrile. Also, unstable constituents like 3-chloro-1-propane, benzenethiol, maleic anhydride, and hexachlorocyclopentadiene also present methodology problems. Finally, certain constituents like resorcinol, trans -1,4-dichloro-2-butene, 2-nitropropane, aniline, 4-amino-biphyenyl, benzidines, hexachlorophene, maleic anhydride, methapyrilene, 3-methylchloanthene, N-nitrosodimethylamine, pentachloronitro-benzene, and tris (2,3-Dibromopropyl) phosphate chromatograph poorly and are virtually impossible to analyze on a reliable basis. This has also been supported by other EPA studies described in the discussion sections of the HWTC interlaboratory study. For these constituents concentration based treatment standards should not be set, only technology standards should be set, such as incineration.

COMMENT NUMBER: 1-D-1
DOCKET NUMBER: LD-00110
COMMENTER: ThermalKEM/CyanoKEM
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

The Agency has used the method detection limit study submitted by the Hazardous Waste Treatment Council (HWTC) to the Agency during the comment period for the Land Disposal Restrictions Rule for Third Third Scheduled Wastes to evaluate whether industry's laboratories can reliably quantify regulated constituents at the level of both the proposed and previously promulgated concentration-based standards established for U and P waste codes. These concentration-based standards are based on incineration ash data from 14 incineration studies conducted by the Agency, specifically, for the Land Disposal Restrictions Program.

The report did state that approximately 60 percent of the BDAT standards promulgated or proposed to date were below the PQLs. This statement is based on the HWTC's definitions of PQLs. The Agency acknowledges the commenters concerns with standards that were promulgated under the First and Second Third Rules and Solvent Rules; however, only standards proposed for the Third Thirds rule will be reexamined by the Agency. The commenters had the opportunity during the comment period for the Thirds and Second Thirds Rules and Solvents Rule to submit concerns and data on the treatment standards that were promulgated for the constituents in each waste code.

The intent of HWTC's study was to verify whether industry's laboratories could routinely quantify the constituents regulated for U and P waste codes and to identify the constituents which could not be quantified at the proposed or promulgated concentration-based standards. The HWTC study consisted of spiking the regulated constituents in samples

COMMENT NUMBER: 1-D-1 (continued)

DOCKET NUMBER: LD-00110

COMMENTER: Thermal Kem/CyanoKem

ISSUE: General BDAT Aspects

SUBISSUE: PQLs

RESPONSE:

of incineration ash at levels near the concentration-based standards and analyzing the samples using SW-846 methods, specifically the micro extraction technique for volatile organics followed by Method 8240 and soxhlet extraction for the semivolatile organics followed by Method 8270. The study was conducted at six laboratories. Each laboratory analyzed seven replicates to determine the method detection limit and seven spiked samples to determine the recovery values for each constituent. The study included information on method detection limits and recovery values. In addition, HWTC calculated treatment standards using their methodology, which is based on practical quantification levels (PQLs) for each constituent. HWTC arbitrarily defined PQLs as a value five times the method detection limit. EPA reiterates that PQLs are minimum measures of analytical laboratory performance, as defined in SW-846, for the use of laboratories in assessing their own performance in terms of success in reaching low levels of certain analytes in certain matrices. Outside of this function of providing a quantitative definition of the boundaries between poor and competent analytical performance, PQLs have no regulatory power.

Although HWTC did conduct a comprehensive method detection limit study for most of the BDAT constituents regulated in the Third Thirds Rule as well as the First and Second Thirds Rules, the documentation submitted to EPA as part of the comment omitted the following items thereby limiting the usefulness of the study:

COMMENT NUMBER: 1-D-1 (continued)

DOCKET NUMBER: LD-00110

COMMENTER: Thermal Kem/CyanoKem

ISSUE: General BDAT Aspects

SUBISSUE: PQLs

RESPONSE:

- Although the six laboratories analyzed seven replicates to determine the method detection limits, data were only presented for the average from each laboratory and the pooled average value calculated from all of the data points submitted by the individual laboratories. As a result, EPA could not evaluate the precision each individual laboratory achieved for determining the detection limits nor could the range of detection limits associated with each set of replicates be examined. Therefore, EPA could not compare the precision of the HWTC data relative to EPA's and as a result could not assess HWTC's comments concerning detection limit precision.

- Characterization data for the untreated waste that was used to generate the incinerator ash used by a laboratory participating in this study were not available. As a result, EPA could not assess the incinerator burns to determine whether substantial treatment of the waste occurred or whether the ash was obtained from a waste that is more or less characteristic of the waste in question than the ash EPA analyzed to set its standards on.

- The measurable levels of both volatile and semivolatile organic constituents present in the unspiked ash suggest inadequate incinerator time or temperature and thus the ash may have been generated from incinerators that were not well-operated or well-designed. The presence of these volatile and semivolatile constituents at measurable quantities in the unspiked ash may also indicate that additional matrix dependent interferences may have been present in the samples used for this study by some of the participating laboratories.

- Incinerator process documentation provided in the study was inadequate to assess whether the incinerators used to generate the ash were well-designed and operated. HWTC did provide primary and secondary chamber combustion temperatures, combustion chamber carbon monoxide content, combustion gas velocity, feed rate, halogen content, and ash content in its comment submitted to the November 22, 1989 proposed standards. The names and addresses of

COMMENT NUMBER: 1-D-1 (continued)
DOCKET NUMBER: LD-00110
COMMENTER: Thermal Kem/CyanoKem
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

> the incinerators generating the ash used in HWTC's study were also given. Some of them were used in several of EPA's own 14 test burns. The six incinerators participating in this study were identified as five rotary kiln incinerators and one multiple hearth incinerator. The limited process data available in the report were presented as ranges plus averages. No data on length of burn, graph charts recording the operating parameters during the incineration burns, or flow sheets of the incineration system were given. In addition, no information was provided on either the sampling point where the ash was collected or the sampling procedures used to collect the ash samples; therefore, EPA could not compare these data with the data collected from the 14 test burns conducted by EPA.

In addition, the HWTC study used different preparation methods before analyzing the samples than those used in EPA's 14 incineration studies. For volatile organics, the HWTC study used the micro extraction technique prior to analysis by SW-846 Method 8240, whereas the EPA incineration test burns used the purge and trap method prior to analysis by SW-846 Method 8240. For semivolatile organics, the HWTC study used soxhlet extraction prior to analysis by SW-846 Method 8270, whereas the EPA incineration studies used sonication prior to analysis by SW-846 Method 8270. One difference between the preparation methods used by HWTC study versus EPA's incineration burns was the sample size used in the analysis. For volatile organics, HWTC used 4 grams of sample in the micro extraction technique versus 5 grams used for purge and trap extraction. For semivolatile organics, HWTC used 10 grams for the soxhlet extraction versus 30 grams used for the sonication extraction. This difference in sample size made it difficult to compare the data from

COMMENT NUMBER: 1-D-1 (continued)

DOCKET NUMBER: LD-00110

COMMENTER: Thermal Kem/CyanoKem

ISSUE: General BDAT Aspects

SUBISSUE: PQLs

RESPONSE:

the two sources. Due to the smaller sample size used in the HWTC study, the detection limits calculated in the study would be higher than those achieved in the 14 incineration test burns conducted by EPA.

EPA also examined the recovery values presented in the HWTC study that were generated by the six laboratories from the analysis of seven replicates for each constituent. EPA used these data to reevaluate the proposed standards. If these recovery values were outside a range of 20 to 200 percent for over half of the data presented then the standards for that specific analyte were reexamined. For some analytes, the HWTC data indicated that a specific laboratory may have had a problem with matrix interferences with specific parts of the chromatograms since reported detection limits were significantly higher than the detection limits reported by the other participating laboratories and the recovery values were also not consistent with the data available from the other laboratories. These matrix interferences could be due in part to the waste that was used to generate the ash or to the incomplete combustion of the ash as supported by the concentration levels of various constituents in the unspiked ash.

EPA did not review any standards that were not in the proposed Third Thirds Rule, specifically, those that were promulgated in the First Thirds and Second Thirds Rule and the Solvent Rule. Changes occurred primarily when EPA reevaluated cases where the HWTC study reported higher detection limits than those used by EPA to calculate standards. Although

COMMENT NUMBER: 1-D-1 (continued)

DOCKET NUMBER: LD-00110

COMMENTER: Thermal Kem/CyanoKem

ISSUE: General BDAT Aspects

SUBISSUE: PQLs

RESPONSE:

EPA had generally used the highest of the set of up to 14 incineration ash detection limits as the basis of the proposed standards, some exceptions had been made in the case of outliers and in cases where EPA believed a particular raw waste matrix best represented the waste code in question. In reviewing the HWTC study information, EPA reexamined those exceptions where the detection limit fell significantly below HWTC's reported detection limits and where there were anomalously high or low recoveries.

EPA had also published a report entitled "USEPA Method Study 36: SW-846 Methods 8270/3510 GC/MS Method for Semivolatile Organics: Capillary Column Technique; Separatory Funnel Liquid-Liquid Extraction," EPA/600/S4-89/010. This study documents analytical problems with several analytes for which Third Thirds standards were proposed. These analytes also were noted as problems in the HWTC study. HWTC also presented the results of this study in their comment.

Based on all the information evaluated from the HWTC study and EPA's Method 36 Study, and the 14 incineration test burns, the standards for the compounds listed in Table 1 were changed from the proposed rule. Below is the explanation of why these standards were changed.

Concentration-based standards for twelve U and P constituents (acetone, chloromethane, 4,4'-methylene bis(2-chloroaniline) 1,4-dioxane, ethyl acetate, ethyl ether, methyl ethyl ketone, N-nitrosopiperidine,

COMMENT NUMBER: 1-D-1 (continued)
DOCKET NUMBER: LD-00110
COMMENTER: Thermal Kem/CyanoKem
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

N-nitrosopyrrolidine, 5-nitro-o-toluidine, N-nitrosodi-n-butylamine, and acrylonitrile) were revised to reflect detection levels in different wastes because the matrices used to generate the proposed standards were ash from burns of phthalate waste (K024), disulfoton wastes (K037), acetonitrile/acrylonitrile wastes (K011, K013, and K014), all unique matrices. Acetone, chloromethane, 1,4-dioxane, ethyl acetate, acrylonitrile, ethyl ether, and methyl ethyl ketone are volatile organics while K024 and K037 raw wastes, from which proposed standards for some of these compounds were derived, are high in semivolatile compounds such as PNA's. The acetonitrile/acrylonitrile wastes (K011, K013, and K014) contain volatile organics; however, it is considered a unique matrix that may not be appropriate for transfer for U and P waste codes. EPA chose to base the promulgated standards on a matrices such as incineration ash from wood-preserving wastes (K001-PCP and creosote), from ethylene dichloride and other mixed wastes (K019 incineration test), or from veterinary pharmaceutical wastes (K102) because these are complex matrices with high concentrations of many organic compounds: volatiles, semivolatiles, chlorinateds, and others, and, consequently, are particularly difficult to analyze so that detection limits from these compounds are particularly achievable for U and P wastes and multi-source leachate nonwastewaters.

N-nitrosopiperidine, N-nitrosopyrrolidine, 5-nitro-o-toluidine, 4,4'-methylene bis(2-chloroaniline), and N-nitrosodi-n-butylamine proposed standards came from the phthalates (K024) waste matrix; the

COMMENT NUMBER: 1-D-1 (continued)
DOCKET NUMBER: LD-00110
COMMENTER: Thermal Kem/CyanoKem
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

promulgated standards derive from detection levels found in the wood preserving waste (K001-PCP) burn, whose value as a source of data is discussed above.

Because the detection limits reported in the HWTC study for vinyl chloride lies well above the detection limit EPA used to develop a concentration-based standard for this waste, EPA is promulgating a higher concentration-based standard. The promulgated standard for vinyl chloride reflects the choice of a different and higher detection limit, this one from the ethylene dichloride (K019) waste matrix.

For acrolein, acetonitrile, 3, 3'-dichlorobenzidine, p-dimethylaminoazobenzidine, chlorobenzilate, 2-naphthylamine, and cyclohexanone, the commenter reported such drastic detection limit discrepancies and/or extreme recoveries that EPA believes these analytes belong in the category of those not amenable to quantification. Therefore, a treatment method will be promulgated instead of a revised concentration-based nonwastewater treatment standard.

For 2-chloro-1,3 butadiene, the commenter reported zero recoveries for several sets of replicates and extremely variable recoveries for another. EPA's own experience in quantifying 2-chloro-1,3 butadiene led the Agency to promulgate a method of treatment for 2-chloro-1,3 butadiene rather than a concentration-based standard as proposed.

COMMENT NUMBER: 1-D-1 (continued)
DOCKET NUMBER: LD-00110
COMMENTER: Thermal Kem/CyanoKem
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

The Third Thirds proposed rule had solicited comment on whether benzal chloride in waste treatment residual matrices could be routinely quantified. The Agency had believed that benzal chloride was too unstable in water to be routinely quantified. No specific information demonstrating successful measurement of benzal chloride were submitted during the comment period. EPA is thus promulgating incineration as a technology-based standard for benzal chloride due to its instability in water instead of the proposed concentration-based standard. (Note that EPA is promulgating as proposed the concentration-based standard for benzal chloride as a constituent of K015 since EPA has analytical data for the untreated K015 wastes and the treatment residuals from incineration of this waste.)

EPA also changed several standards in response to information in a recently released EPA Office of Research and Development (ORD) study, EPA/600/S4-89-010, "USEPA Method Study 36: SW-846 Methods 8270/3510 GC/MS Method for Semivolatile Organics: Capillary Column Technique; Separatory Funnel Liquid-Liquid Extraction," (hereafter referred to as EPA's Method Study 36). This study evaluates the analytical methods most commonly used to quantify semivolatile analytes. "Semivolatiles" are a category of organic chemical including more than half of the compounds regulated in this rule. Although this study was carried out in support of the RCRA ground-water monitoring regulations and consequently looked only at aqueous matrices rather than at the incinerator ash matrices used to develop these nonwastewater concentration-based standards, the study

COMMENT NUMBER: 1-D-1 (continued)
DOCKET NUMBER: LD-00110
COMMENTER: Thermal Kem/CyanoKem
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

documents such serious analytical problems with several Third Thirds analytes that EPA has chosen to promulgate incineration as a treatment standard rather than the proposed concentration-based standards. These analytes are: aramite, benzenethiol, phthalic anhydride, dibenzo(a,e) pyrene, dibenzo(a,i)pyrene, p-benzoquinone, hexachlorocyclopentadine, hexachlorophene, 1,4-naphthoquinone, 1-naphthylamine, N-nitrosodimethylamine, pentachloroethane, resorcinol, and tris(2,3-dibromophosphate).

This study determined how reliably these analytes can be quantified in aqueous matrices by examining the recoveries obtained and the precision achieved over the course of multiple analyses by several laboratories. Statistical analysis indicated that the recovery data for the analytes listed above were so unrealistically high or low that EPA, in the study, has declined to recommend the use of SW-846 methods 3510/8270 for quantifying these analytes in ground-water monitoring at RCRA-permitted facilities.

In promulgating the Third final rule, EPA chose to incorporate this recommendation about the severity of the problems associated with SW-846 methods 3510/8270 and thus move these analytes into the category of those compounds to be regulated with technology-based standards. The reason for this decision is that the study documents significant problems with GC/MS (gas chromatography/mass spectrometry which is the technique used almost exclusively to quantify organic compounds in all environmental samples and which is the basis not only of SW-846 8270, but of most other

COMMENT NUMBER: 1-D-1 (continued)
DOCKET NUMBER: LD-00110
COMMENTER: Thermal Kem/CyanoKem
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

SW-846 methods for organic analytes) which are common to most methods used to quantify these compounds.

However, EPA makes one exception to its decision to promulgate methods as standards for those analytes recommended for deletion from methods 3510 plus 8270 in this ORD study. Since EPA has specific analytical data on the incineration of Dinoseb and since the data was of sufficient QA/QC, EPA is promulgating the concentration-based Dinoseb standards as proposed.

In reviewing its own data, EPA also decided that inadequate documentation exists demonstrating successful quantification of cis- and trans-1,2-dichloro-3-butene. Considering this, together with the problems in quantifying these two as a pair because their widely different boiling points complicate their behavior in the GC/MS apparatus, EPA is promulgating incineration as a method rather than the proposed concentration-based standard.

As noted earlier, The HWTC comment also included calculations of treatment standards based on PQLs. In the HWTC comment, PQLs were defined as five times the method detection limit. HWTC's methodology to calculate treatment standards is the PQL times the accuracy-correction factor (as calculated from the average recovery values) times the variability factor. EPA has published its methodology to calculate treatment standards as the detection limit or concentration level (if

COMMENT NUMBER: 1-D-1 (continued)
DOCKET NUMBER: LD-00110
COMMENTER: Thermal Kem/CyanoKem
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

detected) times the accuracy correction factor times the variability factor. This methodology was published as part of the First and Second Thirds Final Rules. The Agency did not receive any substantial comments concerning the methodology used to calculate the treatment standards.

In addition, EPA used the definitions for method detection limit and practical quantification limits as published in the proposed revisions to the September 1986 edition of Test Methods for Evaluating Solid Waste (also referred to as SW-846). In this document the Agency defined method detection limit as "the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero." Practical quantification limits (PQLs) are defined as "the lowest level of qualification that the Agency believes a competent laboratory can be expected to reliably achieve."

The PQLs published in SW-846 were established to provide a guidance for the analysis of waste samples by acting as minimum performance criteria. Thus, PQLs do not necessarily represent the lowest limits of analytical performance achievable for any given waste. Detection limits are the lowest limit that can be quantified for a given constituent in a given waste.

The PQLs in SW-846 were not developed for a specific waste matrix. PQLs are presented for groundwater and low-level soil. Correction factors are given for other matrices such as high level soil and

COMMENT NUMBER: 1-D-1 (continued)

DOCKET NUMBER: LD-00110

COMMENTER: Thermal Kem/CyanoKem

ISSUE: General BDAT Aspects

SUBISSUE: PQLs

RESPONSE:

non-water miscible waste. Correction factors for treatment residuals such as incinerator ash are not given. Detection limits and PQLs are directly related to the constituent of interest and to the amount of interferences that are present in different waste matrices, therefore, detection limits and PQLs are generally significantly lower for treatment residuals than for untreated waste.

In some cases detection limits and PQLs by their definition in SW-846 can be equal since detection limits are the lowest level that can be quantified for a constituent and PQLs are defined as the lowest level that can be achieved reliably. PQLs are not defined as a factor or multiple of the detection limit. Therefore, data can be reported below a PQL level. Data should not be reported below the detection limit achieved for the specific constituent for a specific matrix. If PQLs were presented for data submitted for this rule, as a factor of the detection limit, then the detection limit information was used to assess the data.

The standards promulgated in the Third Third final rule are derived from detection limits achieved from studies of specific "F" or "K" waste or from the incineration of chemicals listed for specific "U" or "P" wastes or of a similar waste when the treatment standards are transferred. Since the detection limits used to derive the standards are based on the detection limits achieved by the laboratory that analyzed the sample, the Agency believes that other laboratories can achieve the same detection

COMMENT NUMBER: 1-D-1 (continued)
DOCKET NUMBER: LD-00110
COMMENTER: Thermal Kem/CyanoKem
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

limits. In cases where more than one set of data were used to develop the treatment standard, the highest detection limit was usually selected as the basis for the treatment standard. Therefore, the resulting treatment standards reflect the best level of analytical performance that is achievable for the waste.

The Agency does not plan to change its methodology for calculating treatment standards. As a result, only information on detection limits and recovery values were evaluated and used to assess the proposed standards. The Agency did not use any information presented in the HWTC study concerning practical quantification limits to recalculate the standards to be promulgated for the U and P waste codes and for multi-source leachate nonwastewaters. In addition, EPA did not reevaluate standards that were promulgated for wastes under the solvents rule, the First Thirds Rule or the Second Thirds Rule.

The Agency agrees with HWTC that properly developed and validated analytical methods should be used to analyze the constituents regulated in the Third Thirds Rule. EPA has evaluated the analytical data used to calculate the treatment standards for each constituent for each regulated waste code under the Third Thirds Rule. EPA has not set any concentration-based standards for constituents that it believes cannot be analyzed using EPA methods.

COMMENT NUMBER: 1-D-1 (continued)
DOCKET NUMBER: LD-00110
COMMENTER: Thermal Kem/CyanoKem
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

The commenter has specifically noted difficulties in analyzing methanol in incinerated ash at the levels promulgated for F001-F005 wastes. Issues dealing with this waste code were addressed during the comment period for the Solvent Rule in November 1986 and will not be addressed in this Rule.

For the calibration issue, the Agency acknowledges the commenter's support.

Analytical standards are commercially available for benzo(a)pyrene, benzo(g,h,i)perylene, and benzo(k)fluoranthene. Therefore, EPA will promulgate concentration-based treatment standards for these three constituents. For 2-chloro-1,3-butadiene, the commenter states that a commercial standard was unavailable; however, EPA has proposed a treatment method for the U and P wastes; therefore, there is no requirement to analyze for this constituent and no need to obtain this commercial analytical standard.

For 1,2,7,8-dibenzo(a,i)pyrene, the Agency recognizes that there are analytical problems analyzing this constituent; therefore, the Agency will promulgate a treatment method. As a result, there will be no requirement to analyze for this constituent and no need to obtain this commercial analytical standard.

COMMENT NUMBER: 1-D-1 (continued)

DOCKET NUMBER: LD-00110

COMMENTER: Thermal Kem/CyanoKem

ISSUE: General BDAT Aspects

SUBISSUE: PQLs

RESPONSE:

As stated earlier, EPA agrees with the commenter that there are analytical problems associated with the following constituents:

Acrolein
Cyclohexanone
Acetonitrile
Benzenethiol
Maleic anhydride
Hexachlorophene
4-Aminobiphenyl
Hexachlorocyclopentadiene
Trans-1,4-dichloro-2-butene
Resorcinol
2-nitropropane
Benzidines
N-nitrosodimethylamine
Tris(2,3-dibromopropyl)phosphate

Therefore, EPA will promulgate treatment methods for the nonwastewater forms of these U and P wastes.

The Agency believes that the following constituents can be analyzed and will promulgate concentration-based standards for the nonwastewater forms of the following U and P wastes:

1,4-dioxane
Aniline
3-Methylcholanthene
Pentachloronitrobenzene
Methapyrilene

It should be noted that the commenter also listed 3-chloro-1-propane as having analytical problems, however, this constituent is not on the BDAT list and is not regulated. It is assumed that the commenter meant 3-chloro-1-propene (3-chloropropene). EPA believes that this constituent can be analyzed and will promulgate a concentration-based nonwastewater treatment standard.

Table 1 Summary of the Volatile and Semivolatile Constituents with Promulgated Standards Different Than the Proposed Rule

Changes in Concentration-Based Standards for U and P Waste Codes and for Volatile and Semivolatile Organic Constituents for F039 Nonwastewaters[a]

Code	Constituent
P047	4,6-Dinitro-o-cresol
P048	2,4-Dinitrophenol
U002	Acetone
U004	Acetophenone
U005	2-Acetylaminofluorene
U009	Acrylonitrile
U018	Benz(a)anthracene
U022	Benzo(a)pyrene
U043	Vinyl Chloride
U044	Chloroform
U045	Chloromethane
U050	Chrysene
U051	Naphthalene
U051	Pentachlorophenol
U051	Phenanthrene
U051	Pyrene
U051	Toluene
U051	Xylenes (total)
U063	Dibenz(a,h)anthracene
U075	Dichlorodifluoromethane
U076	1,1-Dichloroethane
U077	1,2-Dichloroethane
U078	1,1-Dichloroethylene
U079	trans-1,2-Dichloroethylene
U080	Methylene chloride
U083	1,2-Dichloropropane
U084	cis-1,3-Dichloropropene
U084	trans-1,3-Dichloropropene
U108	1,4-Dioxane
U112	Ethyl acetate
U117	Ethyl ether
U120	Fluoranthene
U131	Hexachloroethane
U137	Indeno(1,2,3-c,d)pyrene
U157	3-Methylcholanthrene

Table 1 (continued)

Code	Constituent
U158	4,4'-Methylenebis (2-chloroaniline)
U159	Methyl ethyl ketone
U165	Naphthalene
U170	4-Nitrophenol
U172	N-Nitrosodi-n-butylamine
U179	N-Nitroso-piperidine
U180	N-Nitroso-pyrrolidine
U181	5-Nitro-o-toluidine
U208	1,1,1,2-Tetrachloroethane
U209	1,1,2,2-Tetrachloroethane
U210	Tetrachloroethene
U211	Carbon tetrachloride
U226	1,1,1-Trichloroethane
U227	1,1,2-Trichloroethane
U239	Xylenes (total)
U243	Hexachloropropene
F039	Acenaphthene
F039	Anthracene
F039	Benzo(g,h,i)perylene
F039	Bromodichloro methane
F039	Butyl benzl phthalate
F039	Chlorodibromomethane
F039	Fluorene

[a] The changes in concentration-based standards occurred because:

(1) EPA decided not to base concentration-based standards for U and P nonwastewaters and F039 nonwastewaters on data from three of the fourteen test burns and to recalculate concentration-based standards for promulgation with data from other test burns involving matrices more similar to U and P matrices.

(2) EPA reevaluated the use of recovery factors in calculating concentration-bases standards. EPA had calculated the proposed concentration-based standard for halogenated aliphatics, aromatics, and polynuclear aromatics using an averaged recovery factor from several of the spiked constituents. The standards for the rest of the U wastes were calculated using a recovery factor from a single constituent. To ensure consistency among all concentration-based standards, EPA chose to recalculate the standards using a single constituent recovery factor.

Table 1 (continued)

Changes in Concentration-Based Standards to Technology-Based Standards for U and P Nonwastewaters for Volatile and Semivolatile Organics

Revised for Codes:	Constituent
U003	Acetonitrile
P003	Acrolein
U017	Benzal chloride
U074	1,4-Dichloro-2-butene (cis and trans)
U197	p-Benzoquinone
U038	Chlorobenzilate
U057	Cyclohexanone
U073	3,3'-Dichlorobenzidine
U093	p-Dimethylaminoazobenzene
U130	Hexachlorocyclopentadiene
U132	Hexachlorophene
U166	1,4-Naphthoquinone
U167	1-Naphthylamine
U168	2-Naphthylamine
P082	N-Nitrosodimethylamine
U184	Pentachloroethane
U201	Resorcinol

Table 1 (continued)

Volatile and Semivolatile Organic Constituents for Which Concentration-Based Standards Have Been Dropped for F039 Nonwastewaters

---

Acetonitrile (U003)
Acrolein (P003)
Acrylamide
4-Amino biphenyl
2-Chloro-1,3-butadiene
1,4-Dichloro-2-butene (cis and trans) (U074)
Aramite
Benzal chloride (U017)
Benzenethiol
p-Benzoquinone (U197)
Chlorobenzilate (U038)
Cyclohexanone (U057)
Dibenzo(a,e)pyrene
Dibenzo (a,i) pyrene
3,3'-Dichlorobenzidine (U073)
p-Dimethylaminoazobenzene (U093)
Diphenylamine
Diphenylnitrosamine
Hexachlorocyclopentadiene (U130)
Hexachlorophene (U132)
Methanol
1,4-Naphthoquinone (U166)
1-Naphthylamine (U167)
2-Naphthylamine (U168)
N-Nitrosodimethylamine (P082)
Pentachloroethane (U184)
Phthalic anhydride
Resorcinol (U201)
Tris(2,3-dibromophosphate)

Comment Number: 1-D-2

Docket Number: LD12-00124

Commenter: Rollins Environmental Services

Issue: General BDAT Aspects

Subissue: PQLs

Comment:

PQL AND TREATMENT STANDARDS

The Hazardous Waste Treatment Council has submitted to the Docket on this proposed rule a comprehensive report on PQLs achievable for incineration ash matrices. This report, entitled "Method Detection Limits and Practical Quantitation Limits For Incinerator Ash Matrices - Interlaboratory Study" covers studies performed by six member incineration firms, including RES, in cooperation with the EPA Methods Branch.

The data in this report indicate that for a substantial number of the BDAT standards promulgated or proposed to date, PQLs in incinerator ash are higher then the level set as the BDAT standard. RES urges that this fact be recognized in setting the final treatment standards for third-thirds wastes, and utilized to make revisions in connection with treatment standards previously promulgated, ~~as discussed further, below.~~

It should be pointed out that EPA has not determined PQLs for untreated waste, only for soil and wastewater. However, EPA asserts in the Third-Thirds proposed rule preamble that it expects that PQLs for incinerator ash is substantially lower than those for untreated waste.

In making the statement, EPA is assuming that the only matrix interference effect is that arising from some major organic component or components in the untreated waste. However, as proven by the HWTC interlaboratory study, there are major physical factors that affect the PQLs for incinerator ash, making these higher in many cases than those PQLs achievable for untreated waste. These factors are discussed in the HWTC report, and include the absorption effects of the activated carbon and silicates in the incinerator ash, and the surface features of incinerator ash which include a large number of active sites for absorption effects. These effects make incinerator ash matrices vastly different than soil or untreated waste matrices.

HWTC member companies, at great expense, have completed a detailed interlaboratory PQL study specifically on incinerator ash matrices. This study was done in full cooperation with the EPA Methods Branch, with guidance and support provided by David Friedman and staff. The HWTC requests that the Waste Treatment Branch of EPA set final treatment standards for waste constituents consistent with the true PQLs for incinerator ash determined by the HWTC study.

Comment Number: 1-D-2 continued
Docket Number: LD12-00124
Commenter: Rollins Environmental Services
Issue: General BDAT Aspects
Subissue: PQLs
Comment:

More specifically, this can be accomplished by either one of two approaches. One approach would be to set a third set of treatment standards in addition to the current "wastewater" and "nonwastewater". This third set of standards would be for "incinerator ash" and would be based on the PQL's established in the HWTC study.

A second approach would be not to change the treatment standards, but to allow a "non-detect" determination at or below the PQL (per the HWTC study) to be considered as satisfying the BDAT for incinerator ash. Under this approach, EPA would have to specify QA/QC and related requirements, and the laboratory would have to retain the relevant data in its file for inspection by EPA.

Whichever course is chosen, incineration facilities cannot be subject to enforcement action because laboratories cannot routinely detect constituents in incinerator ash at the treatment standard levels.

Ultimately, because of these problems and the unnecessary paperwork and other issues associated with waste-code-carrythrough in multi-source incinerator ash, a separate waste code should be established for treated multi-source ash.

COMMENT NUMBER: 1-D-2
DOCKET NUMBER: LD12-00124
COMMENTER: Rollins Environmental Services
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

The Agency has used the method detection limit study submitted by the Hazardous Waste Treatment Council (HWTC) to the Agency during the comment period for the Land Disposal Restrictions Rule for Third Third Scheduled Wastes to evaluate whether industry's laboratories can reliably quantify regulated constituents at the level of both the proposed and previously promulgated concentration-based standards established for U and P waste codes. These concentration-based standards are based on incineration ash data from 14 incineration studies conducted by the Agency, specifically, for the Land Disposal Restrictions Program.

The intent of HWTC's study was to verify whether industry's laboratories could routinely quantify the constituents regulated for U and P waste codes and to identify the constituents which could not be quantified at the proposed or promulgated concentration-based standards. The HWTC study consisted of spiking the regulated constituents in samples of incineration ash at levels near the concentration-based standards and analyzing the samples using SW-846 methods, specifically the micro extraction technique for volatile organics followed by Method 8240 and soxhlet extraction for the semivolatile organics followed by Method 8270. The study was conducted at six laboratories. Each laboratory analyzed seven replicates to determine the method detection limit and seven spiked samples to determine the recovery values for each constituent. The study included information on method detection limits and recovery values. In addition, HWTC calculated treatment standards using their methodology, which is based on practical quantification

COMMENT NUMBER: 1-D-2 (continued)

DOCKET NUMBER: LD12-00124

COMMENTER: Rollins Environmental Services

ISSUE: General BDAT Aspects

SUBISSUE: PQLs

RESPONSE:

levels (PQLs) for each constituent. HWTC arbitrarily defined PQLs as a value five times the method detection limit. EPA reiterates that PQLs are minimum measures of analytical laboratory performance, as defined in SW-846, for the use of laboratories in assessing their own performance in terms of success in reaching low levels of certain analytes in certain matrices. Outside of this function of providing a quantitative definition of the boundaries between poor and competent analytical performance, PQLs have no regulatory power.

Although HWTC did conduct a comprehensive method detection limit study for most of the BDAT constituents regulated in the Third Thirds Rule as well as the First and Second Thirds Rules, the documentation submitted to EPA as part of the comment omitted the following items thereby limiting the usefulness of the study:

- Although the six laboratories analyzed seven replicates to determine the method detection limits, data were only presented for the average from each laboratory and the pooled average value calculated from all of the data points submitted by the individual laboratories. As a result, EPA could not evaluate the precision each individual laboratory achieved for determining the detection limits nor could the range of detection limits associated with each set of replicates be examined. Therefore, EPA could not compare the precision of the HWTC data relative to EPA's and as a result could not assess HWTC's comments concerning detection limit precision.
- Characterization data for the untreated waste that was used to generate the incinerator ash used by a laboratory participating in this study were not available. As a result, EPA could not assess

COMMENT NUMBER: 1-D-2 (continued)
DOCKET NUMBER: LD12-00124
COMMENTER: Rollins Environmental Services
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

the incinerator burns to determine whether substantial treatment of the waste occurred or whether the ash was obtained from a waste that is more or less characteristic of the waste in question than the ash EPA analyzed to set its standards on.

- The measurable levels of both volatile and semivolatile organic constituents present in the unspiked ash suggest inadequate incinerator time or temperature and thus the ash may have been generated from incinerators that were not well-operated or well-designed. The presence of these volatile and semivolatile constituents at measurable quantities in the unspiked ash may also indicate that additional matrix dependent interferences may have been present in the samples used for this study by some of the participating laboratories.

- Incinerator process documentation provided in the study was inadequate to assess whether the incinerators used to generate the ash were well-designed and operated. HWTC did provide primary and secondary chamber combustion temperatures, combustion chamber carbon monoxide content, combustion gas velocity, feed rate, halogen content, and ash content in its comment submitted to the November 22, 1989 proposed standards. The names and addresses of the incinerators generating the ash used in HWTC's study were also given. Some of them were used in several of EPA's own 14 test burns. The six incinerators participating in this study were identified as five rotary kiln incinerators and one multiple hearth incinerator. The limited process data available in the report were presented as ranges plus averages. No data on length of burn, graph charts recording the operating parameters during the incineration burns, or flow sheets of the incineration system were given. In addition, no information was provided on either the sampling point where the ash was collected or the sampling procedures used to collect the ash samples; therefore, EPA could not compare these data with the data collected from the 14 test burns conducted by EPA.

COMMENT NUMBER: 1-D-2 (continued)
DOCKET NUMBER: LD12-00124
COMMENTER: Rollins Environmental Services
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

In addition, the HWTC study used different preparation methods before analyzing the samples than those used in EPA's 14 incineration studies. For volatile organics, the HWTC study used the micro extraction technique prior to analysis by SW-846 Method 8240, whereas the EPA incineration test burns used the purge and trap method prior to analysis by SW-846 Method 8240. For semivolatile organics, the HWTC study used soxhlet extraction prior to analysis by SW-846 Method 8270, whereas the EPA incineration studies used sonication prior to analysis by SW-846 Method 8270. One difference between the preparation methods used by HWTC study versus EPA's incineration burns was the sample size used in the analysis. For volatile organics, HWTC used 4 grams of sample in the micro extraction technique versus 5 grams used for purge and trap extraction. For semivolatile organics, HWTC used 10 grams for the soxhlet extraction versus 30 grams used for the sonication extraction. This difference in sample size made it difficult to compare the data from the two sources. Due to the smaller sample size used in the HWTC study, the detection limits calculated in the study would be higher than those achieved in the 14 incineration test burns conducted by EPA.

EPA also examined the recovery values presented in the HWTC study that were generated by the six laboratories from the analysis of seven replicates for each constituent. EPA used these data to reevaluate the proposed standards. If these recovery values were outside a range of 20 to 200 percent for over half of the data presented then the standards for that specific analyte were reexamined. For some analytes, the HWTC data

COMMENT NUMBER: 1-D-2 (continued)
DOCKET NUMBER: LD12-00124
COMMENTER: Rollins Environmental Services
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

indicated that a specific laboratory may have had a problem with matrix interferences with specific parts of the chromatograms since reported detection limits were significantly higher than the detection limits reported by the other participating laboratories and the recovery values were also not consistent with the data available from the other laboratories. These matrix interferences could be due in part to the waste that was used to generate the ash or to the incomplete combustion of the ash as supported by the concentration levels of various constituents in the unspiked ash.

EPA did not review any standards that were not in the proposed Third Thirds Rule, specifically, those that were promulgated in the First Thirds and Second Thirds Rule and the Solvent Rule. Changes occurred primarily when EPA reevaluated cases where the HWTC study reported higher detection limits than those used by EPA to calculate standards. Although EPA had generally used the highest of the set of up to 14 incineration ash detection limits as the basis of the proposed standards, some exceptions had been made in the case of outliers and in cases where EPA believed a particular raw waste matrix best represented the waste code in question. In reviewing the HWTC study information, EPA reexamined those exceptions where the detection limit fell significantly below HWTC's reported detection limits and where there were anomalously high or low recoveries.

COMMENT NUMBER: 1-D-2 (continued)
DOCKET NUMBER: LD12-00124
COMMENTER: Rollins Environmental Services
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

EPA had also published a report entitled "USEPA Method Study 36: SW-846 Methods 8270/3510 GC/MS Method for Semivolatile Organics: Capillary Column Technique; Separatory Funnel Liquid-Liquid Extraction," EPA/600/S4-89/010. This study documents analytical problems with several analytes for which Third Thirds standards were proposed. These analytes also were noted as problems in the HWTC study. HWTC also presented the results of this study in their comment.

Based on all the information evaluated from the HWTC study and EPA's Method 36 Study, and the 14 incineration test burns, the standards for the compounds listed in Table 1 were changed from the proposed rule. Below is the explanation of why these standards were changed.

Concentration-based standards for twelve U and P constituents (acetone, chloromethane, 4,4'-methylene bis(2-chloroaniline) 1,4-dioxane, ethyl acetate, ethyl ether, methyl ethyl ketone, N-nitrosopiperidine, N-nitrosopyrrolidine, 5-nitro-o-toluidine, N-nitrosodi-n-butylamine, and acrylonitrile) were revised to reflect detection levels in different wastes because the matrices used to generate the proposed standards were ash from burns of phthalate waste (K024), disulfoton wastes (K037), acetonitrile/acrylonitrile wastes (K011, K013, and K014), all unique matrices. Acetone, chloromethane, 1,4-dioxane, ethyl acetate, acrylonitrile, ethyl ether, and methyl ethyl ketone are volatile organics while K024 and K037 raw wastes, from which proposed standards for some of these compounds were derived, are high in semivolatile compounds such as

COMMENT NUMBER: 1-D-2 (continued)
DOCKET NUMBER: LD12-00124
COMMENTER: Rollins Environmental Services
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

PNA's. The acetonitrile/acrylonitrile wastes (K011, K013, and K014) contain volatile organics; however, it is considered a unique matrix that may not be appropriate for transfer for U and P waste codes. EPA chose to base the promulgated standards on a matrices such as incineration ash from wood-preserving wastes (K001-PCP and creosote), from ethylene dichloride and other mixed wastes (K019 incineration test), or from veterinary pharmaceutical wastes (K102) because these are complex matrices with high concentrations of many organic compounds: volatiles, semivolatiles, chlorinateds, and others, and, consequently, are particularly difficult to analyze so that detection limits from these compounds are particularly achievable for U and P wastes and multi-source leachate nonwastewaters.

N-nitrosopiperidine, N-nitrosopyrrolidine, 5-nitro-o-toluidine, 4,4'-methylene bis(2-chloroaniline), and N-nitrosodi-n-butylamine proposed standards came from the phthalates (K024) waste matrix; the promulgated standards derive from detection levels found in the wood preserving waste (K001-PCP) burn, whose value as a source of data is discussed above.

Because the detection limits reported in the HWTC study for vinyl chloride lies well above the detection limit EPA used to develop a concentration-based standard for this waste, EPA is promulgating a higher concentration-based standard. The promulgated standard for vinyl chloride reflects the choice of a different and higher detection limit, this one from the ethylene dichloride (K019) waste matrix.

COMMENT NUMBER: 1-D-2 (continued)

DOCKET NUMBER: LD12-00124

COMMENTER: Rollins Environmental Services

ISSUE: General BDAT Aspects

SUBISSUE: PQLs

RESPONSE:

For acrolein, acetonitrile, 3, 3'-dichlorobenzidine, p-dimethylaminoazobenzidine, chlorobenzilate, 2-naphthylamine, and cyclohexanone, the commenter reported such drastic detection limit discrepancies and/or extreme recoveries that EPA believes these analytes belong in the category of those not amenable to quantification. Therefore, a treatment method will be promulgated instead of a revised concentration-based nonwastewater treatment standard.

For 2-chloro-1,3 butadiene, the commenter reported zero recoveries for several sets of replicates and extremely variable recoveries for another. EPA's own experience in quantifying 2-chloro-1,3 butadiene led the Agency to promulgate a method of treatment for 2-chloro-1,3 butadiene rather than a concentration-based standard as proposed.

The Third Thirds proposed rule had solicited comment on whether benzal chloride in waste treatment residual matrices could be routinely quantified. The Agency had believed that benzal chloride was too unstable in water to be routinely quantified. No specific information demonstrating successful measurement of benzal chloride were submitted during the comment period. EPA is thus promulgating incineration as a technology-based standard for benzal chloride due to its instability in water instead of the proposed concentration-based standard. (Note that EPA is promulgating as proposed the concentration-based standard for benzal chloride as a constituent of K015 since EPA has analytical data for the untreated K015 wastes and the treatment residuals from incineration of this waste.)

COMMENT NUMBER: 1-D-2 (continued)
DOCKET NUMBER: LD12-00124
COMMENTER: Rollins Environmental Services
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

EPA also changed several standards in response to information in a recently released EPA Office of Research and Development (ORD) study, EPA/600/S4-89-010, "USEPA Method Study 36: SW-846 Methods 8270/3510 GC/MS Method for Semivolatile Organics: Capillary Column Technique; Separatory Funnel Liquid-Liquid Extraction," (hereafter referred to as EPA's Method Study 36). This study evaluates the analytical methods most commonly used to quantify semivolatile analytes. "Semivolatiles" are a category of organic chemical including more than half of the compounds regulated in this rule. Although this study was carried out in support of the RCRA ground-water monitoring regulations and consequently looked only at aqueous matrices rather than at the incinerator ash matrices used to develop these nonwastewater concentration-based standards, the study documents such serious analytical problems with several Third Thirds analytes that EPA has chosen to promulgate incineration as a treatment standard rather than the proposed concentration-based standards. These analytes are: aramite, benzenethiol, phthalic anhydride, dibenzo(a,e) pyrene, dibenzo(a,i)pyrene, p-benzoquinone, hexachlorocyclopentadine, hexachlorophene, 1,4-naphthoquinone, 1-naphthylamine, N-nitrosodimethylamine, pentachloroethane, resorcinol, and tris(2,3-dibromophosphate).

This study determined how reliably these analytes can be quantified in aqueous matrices by examining the recoveries obtained and the precision achieved over the course of multiple analyses by several laboratories. Statistical analysis indicated that the recovery data for the analytes listed above were so unrealistically high or low that EPA,

COMMENT NUMBER: 1-D-2 (continued)
DOCKET NUMBER: LD12-00124
COMMENTER: Rollins Environmental Services
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

in the study, has declined to recommend the use of SW-846 methods 3510/8270 for quantifying these analytes in ground-water monitoring at RCRA-permitted facilities.

In promulgating the Third final rule, EPA chose to incorporate this recommendation about the severity of the problems associated with SW-846 methods 3510/8270 and thus move these analytes into the category of those compounds to be regulated with technology-based standards. The reason for this decision is that the study documents significant problems with GC/MS (gas chromatography/mass spectrometry which is the technique used almost exclusively to quantify organic compounds in all environmental samples and which is the basis not only of SW-846 8270, but of most other SW-846 methods for organic analytes) which are common to most methods used to quantify these compounds.

However, EPA makes one exception to its decision to promulgate methods as standards for those analytes recommended for deletion from methods 3510 plus 8270 in this ORD study. Since EPA has specific analytical data on the incineration of Dinoseb and since the data was of sufficient QA/QC, EPA is promulgating the concentration-based Dinoseb standards as proposed.

In reviewing its own data, EPA also decided that inadequate documentation exists demonstrating successful quantification of cis- and trans-1,2-dichloro-3-butene. Considering this, together with the

COMMENT NUMBER: 1-D-2 (continued)
DOCKET NUMBER: LD12-00124
COMMENTER: Rollins Environmental Services
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

problems in quantifying these two as a pair because their widely different boiling points complicate their behavior in the GC/MS apparatus, EPA is promulgating incineration as a method rather than the proposed concentration-based standard.

As noted earlier, The HWTC comment also included calculations of treatment standards based on PQLs. In the HWTC comment, PQLs were defined as five times the method detection limit. HWTC's methodology to calculate treatment standards is the PQL times the accuracy-correction factor (as calculated from the average recovery values) times the variability factor. EPA has published its methodology to calculate treatment standards as the detection limit or concentration level (if detected) times the accuracy correction factor times the variability factor. This methodology was published as part of the First and Second Thirds Final Rules. The Agency did not receive any substantial comments concerning the methodology used to calculate the treatment standards.

In addition, EPA used the definitions for method detection limit and practical quantification limits as published in the proposed revisions to the September 1986 edition of Test Methods for Evaluating Solid Waste (also referred to as SW-846). In this document the Agency defined method detection limit as "the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero." Practical quantification limits (PQLs) are defined as "the lowest level of qualification that the Agency believes a competent laboratory can be expected to reliably achieve."

COMMENT NUMBER: 1-D-2 (continued)
DOCKET NUMBER: LD12-00124
COMMENTER: Rollins Environmental Services
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

The PQLs published in SW-846 were established to provide a guidance for the analysis of waste samples by acting as minimum performance criteria. Thus, PQLs do not necessarily represent the lowest limits of analytical performance achievable for any given waste. Detection limits are the lowest limit that can be quantified for a given constituent in a given waste.

The PQLs in SW-846 were not developed for a specific waste matrix. PQLs are presented for groundwater and low-level soil. Correction factors are given for other matrices such as high level soil and non-water miscible waste. Correction factors for treatment residuals such as incinerator ash are not given. Detection limits and PQLs are directly related to the constituent of interest and to the amount of interferences that are present in different waste matrices, therefore, detection limits and PQLs are generally significantly lower for treatment residuals than for untreated waste.

In some cases detection limits and PQLs by their definition in SW-846 can be equal since detection limits are the lowest level that can be quantified for a constituent and PQLs are defined as the lowest level that can be achieved reliably. PQLs are not defined as a factor or multiple of the detection limit. Therefore, data can be reported below a PQL level. Data should not be reported below the detection limit achieved for the specific constituent for a specific matrix. If PQLs were presented for data submitted for this rule, as a factor of the

COMMENT NUMBER: 1-D-2 (continued)
DOCKET NUMBER: LD12-00124
COMMENTER: Rollins Environmental Services
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

detection limit, then the detection limit information was used to assess the data.

The standards promulgated in the Third Third final rule are derived from detection limits achieved from studies of specific "F" or "K" waste or from the incineration of chemicals listed for specific "U" or "P" wastes or of a similar waste when the treatment standards are transferred. Since the detection limits used to derive the standards are based on the detection limits achieved by the laboratory that analyzed the sample, the Agency believes that other laboratories can achieve the same detection limits. In cases where more than one set of data were used to develop the treatment standard, the highest detection limit was usually selected as the basis for the treatment standard. Therefore, the resulting treatment standards reflect the best level of analytical performance that is achievable for the waste.

The Agency does not plan to change its methodology for calculating treatment standards. As a result, only information on detection limits and recovery values were evaluated and used to assess the proposed standards. The Agency did not use any information presented in the HWTC study concerning practical quantification limits to recalculate the standards to be promulgated for the U and P waste codes and for multi-source leachate nonwastewaters. In addition, EPA did not reevaluate standards that were promulgated for wastes under the solvents rule, the First Thirds Rule or the Second Thirds Rule.

Table 1 Summary of the Volatile and Semivolatile Constituents with Promulgated Standards Different Than the Proposed Rule

Changes in Concentration-Based Standards for U and P Waste Codes and for Volatile and Semivolatile Organic Constituents for F039 Nonwastewaters[a]

Code	Constituent
P047	4,6-Dinitro-o-cresol
P048	2,4-Dinitrophenol
U002	Acetone
U004	Acetophenone
U005	2-Acetylaminofluroene
U009	Acrylonitrile
U018	Benz(a)anthracene
U022	Benzo(a)pyrene
U043	Vinyl Chloride
U044	Chloroform
U045	Chloromethane
U050	Chrysene
U051	Naphthalene
U051	Pentachlorophenol
U051	Phenanthrene
U051	Pyrene
U051	Toluene
U051	Xylenes (total)
U063	Dibenz(a,h)anthracene
U075	Dichlorodifluoromethane
U076	1,1-Dichloroethane
U077	1,2-Dichloroethane
U078	1,1-Dichloroethylene
U079	trans-1,2-Dichloroethylene
U080	Methylene chloride
U083	1,2-Dichloropropane
U084	cis-1,3-Dichloropropene
U084	trans-1,3-Dichloropropene
U108	1,4-Dioxane
U112	Ethyl acetate
U117	Ethyl ether
U120	Fluoranthene
U131	Hexachloroethane
U137	Indeno(1,2,3-c,d)pyrene
U157	3-Methylcholanthrene

Table 1 (continued)

Code	Constituent
U158	4,4'-Methylenebis (2-chloroaniline)
U159	Methyl ethyl ketone
U165	Naphthalene
U170	4-Nitrophenol
U172	N-Nitrosodi-n-butylamine
U179	N-Nitroso-piperidine
U180	N-Nitroso-pyrrolidine
U181	5-Nitro-o-toluidine
U208	1,1,1,2-Tetrachloroethane
U209	1,1,2,2-Tetrachloroethane
U210	Tetrachloroethene
U211	Carbon tetrachloride
U226	1,1,1-Trichloroethane
U227	1,1,2-Trichloroethane
U239	Xylenes (total)
U243	Hexachloropropene
F039	Acenaphthene
F039	Anthracene
F039	Benzo(g,h,i)perylene
F039	Bromodichloro methane
F039	Butyl benzl phthalate
F039	Chlorodibromomethane
F039	Fluorene

[a]The changes in concentration-based standards occurred because:

(1) EPA decided not to base concentration-based standards for U and P nonwastewaters and F039 nonwastewaters on data from three of the fourteen test burns and to recalculate concentration-based standards for promulgation with data from other test burns involving matrices more similar to U and P matrices.

(2) EPA reevaluated the use of recovery factors in calculating concentration-bases standards. EPA had calculated the proposed concentration-based standard for halogenated aliphatics, aromatics, and polynuclear aromatics using an averaged recovery factor from several of the spiked constituents. The standards for the rest of the U wastes were calculated using a recovery factor from a single constituent. To enxure consistancy among all concentration-based standards, EPA chose to recalculate the standards using a single constituent recovery factor.

Table 1 (continued)

Changes in Concentration-Based Standards to Technology-Based Standards for U and P Nonwastewaters for Volatile and Semivolatile Organics

Revised for Codes:	Constituent
U003	Acetonitrile
P003	Acrolein
U017	Benzal chloride
U074	1,4-Dichloro-2-butene (cis and trans)
U197	p-Benzoquinone
U038	Chlorobenzilate
U057	Cyclohexanone
U073	3,3'-Dichlorobenzidine
U093	p-Dimethylaminoazobenzene
U130	Hexachlorocyclopentadiene
U132	Hexachlorophene
U166	1,4-Naphthoquinone
U167	1-Naphthylamine
U168	2-Naphthylamine
P082	N-Nitrosodimethylamine
U184	Pentachloroethane
U201	Resorcinol

Table 1 (continued)

Volatile and Semivolatile Organic Constituents for Which Concentration-Based Standards Have Been Dropped for F039 Nonwastewaters

Acetonitrile (U003)
Acrolein (P003)
Acrylamide
4-Amino biphenyl
2-Chloro-1,3-butadiene
1,4-Dichloro-2-butene (cis and trans) (U074)
Aramite
Benzal chloride (U017)
Benzenethiol
p-Benzoquinone (U197)
Chlorobenzilate (U038)
Cyclohexanone (U057)
Dibenzo(a,e)pyrene
Dibenzo (a,i) pyrene
3,3'-Dichlorobenzidine (U073)
p-Dimethylaminobenzene (U093)
Dilphenylamine
Diphenylnitrosamine
Hexachlorocyclopentadiene (U130)
Hexachlorophene (U132)
Methanol
1,4-Naphthoquinone (U166)
1-Naphthylamine (U167)
2-Naphthylamine (U168)
N-Nitrosodimethylamine (P082)
Pentachloroethane (U184)
Phthalic anhydride
Resorcinol (U201)
Tris(2,3-dibromophosphate)

Comment Number: 1-D-3
Docket Number: LD12 - 00150
Commenter: Ross Environmental Services, Inc.
Issue: General BDAT Aspects
Subissue: PQLs
Comment:

At great expense Ross has participated in the Hazardous Waste Treatment Council's Method Detection Limits and Practical Quantitation Limits Interlaboratory Study submitted to EPA on December 22, 1989.

EPA stated in the preamble to the Third-Thirds proposed rule that PQL's for treatment residues, such as incinerator ash, are significantly lower than the PQL's for untreated waste. This statement is contrary to the experience of Ross. The above referenced study was undertaken to determine the validity of BDAT standards for incinerator ash, considering the unique matrix properties of incinerator ash.

Ross urges you to consider the data and recommendations included in the Hazardous Waste Treatment Council's Interlaboratory Study. Treatment standards must be reliably achievable on a routine basis.

COMMENT NUMBER: 1-D-3
DOCKET NUMBER: LD12-00150
COMMENTER: Ross Environmental Services, Inc.
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

The Agency has used the method detection limit study submitted by the Hazardous Waste Treatment Council (HWTC) to the Agency during the comment period for the Land Disposal Restrictions Rule for Third Third Scheduled Wastes to evaluate whether industry's laboratories can reliably quantify regulated constituents at the level of both the proposed and previously promulgated concentration-based standards established for U and P waste codes. These concentration-based standards are based on incineration ash data from 14 incineration studies conducted by the Agency, specifically, for the Land Disposal Restrictions Program.

The intent of HWTC's study was to verify whether industry's laboratories could routinely quantify the constituents regulated for U and P waste codes and to identify the constituents which could not be quantified at the proposed or promulgated concentration-based standards. The HWTC study consisted of spiking the regulated constituents in samples of incineration ash at levels near the concentration-based standards and analyzing the samples using SW-846 methods, specifically the micro extraction technique for volatile organics followed by Method 8240 and soxhlet extraction for the semivolatile organics followed by Method 8270. The study was conducted at six laboratories. Each laboratory analyzed seven replicates to determine the method detection limit and seven spiked samples to determine the recovery values for each constituent. The study included information on method detection limits and recovery values. In addition, HWTC calculated treatment standards using their methodology, which is based on practical quantification

COMMENT NUMBER: 1-D-3 (continued)
DOCKET NUMBER: LD12-00150
COMMENTER: Ross Environmental Services, Inc.
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

levels (PQLs) for each constituent. HWTC arbitrarily defined PQLs as a value five times the method detection limit. EPA reiterates that PQLs are minimum measures of analytical laboratory performance, as defined in SW-846, for the use of laboratories in assessing their own performance in terms of success-in reaching low levels of certain analytes in certain matrices. Outside of this function of providing a quantitative definition of the boundaries between poor and competent analytical performance, PQLs have no regulatory power.

Although HWTC did conduct a comprehensive method detection limit study for most of the BDAT constituents regulated in the Third Thirds Rule as well as the First and Second Thirds Rules, the documentation submitted to EPA as part of the comment omitted the following items thereby limiting the usefulness of the study:

- Although the six laboratories analyzed seven replicates to determine the method detection limits, data were only presented for the average from each laboratory and the pooled average value calculated from all of the data points submitted by the individual laboratories. As a result, EPA could not evaluate the precision each individual laboratory achieved for determining the detection limits nor could the range of detection limits associated with each set of replicates be examined. Therefore, EPA could not compare the precision of the HWTC data relative to EPA's and as a result could not assess HWTC's comments concerning detection limit precision.

- Characterization data for the untreated waste that was used to generate the incinerator ash used by a laboratory participating in this study were not available. As a result, EPA could not assess

COMMENT NUMBER: 1-D-3 (continued)

DOCKET NUMBER: LD12-00150

COMMENTER: Ross Environmental Services, Inc.

ISSUE: General BDAT Aspects

SUBISSUE: PQLs

RESPONSE:

the incinerator burns to determine whether substantial treatment of the waste occurred or whether the ash was obtained from a waste that is more or less characteristic of the waste in question than the ash EPA analyzed to set its standards on.

- The measurable levels of both volatile and semivolatile organic constituents present in the unspiked ash suggest inadequate incinerator time or temperature and thus the ash may have been generated from incinerators that were not well-operated or well-designed. The presence of these volatile and semivolatile constituents at measurable quantities in the unspiked ash may also indicate that additional matrix dependent interferences may have been present in the samples used for this study by some of the participating laboratories.

- Incinerator process documentation provided in the study was inadequate to assess whether the incinerators used to generate the ash were well-designed and operated. HWTC did provide primary and secondary chamber combustion temperatures, combustion chamber carbon monoxide content, combustion gas velocity, feed rate, halogen content, and ash content in its comment submitted to the November 22, 1989 proposed standards. The names and addresses of the incinerators generating the ash used in HWTC's study were also given. Some of them were used in several of EPA's own 14 test burns. The six incinerators participating in this study were identified as five rotary kiln incinerators and one multiple hearth incinerator. The limited process data available in the report were presented as ranges plus averages. No data on length of burn, graph charts recording the operating parameters during the incineration burns, or flow sheets of the incineration system were given. In addition, no information was provided on either the sampling point where the ash was collected or the sampling procedures used to collect the ash samples; therefore, EPA could not compare these data with the data collected from the 14 test burns conducted by EPA.

COMMENT NUMBER: 1-D-3 (continued)
DOCKET NUMBER: LD12-00150
COMMENTER: Ross Environmental Services, Inc.
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

In addition, the HWTC study used different preparation methods before analyzing the samples than those used in EPA's 14 incineration studies. For volatile organics, the HWTC study used the micro extraction technique prior to analysis by SW-846 Method 8240, whereas the EPA incineration test burns used the purge and trap method prior to analysis by SW-846 Method 8240. For semivolatile organics, the HWTC study used soxhlet extraction prior to analysis by SW-846 Method 8270, whereas the EPA incineration studies used sonication prior to analysis by SW-846 Method 8270. One difference between the preparation methods used by HWTC study versus EPA's incineration burns was the sample size used in the analysis. For volatile organics, HWTC used 4 grams of sample in the micro extraction technique versus 5 grams used for purge and trap extraction. For semivolatile organics, HWTC used 10 grams for the soxhlet extraction versus 30 grams used for the sonication extraction. This difference in sample size made it difficult to compare the data from the two sources. Due to the smaller sample size used in the HWTC study, the detection limits calculated in the study would be higher than those achieved in the 14 incineration test burns conducted by EPA.

EPA also examined the recovery values presented in the HWTC study that were generated by the six laboratories from the analysis of seven replicates for each constituent. EPA used these data to reevaluate the proposed standards. If these recovery values were outside a range of 20 to 200 percent for over half of the data presented then the standards for that specific analyte were reexamined. For some analytes, the HWTC data

COMMENT NUMBER: 1-D-3 (continued)

DOCKET NUMBER: LD12-00150

COMMENTER: Ross Environmental Services, Inc.

ISSUE: General BDAT Aspects

SUBISSUE: PQLs

RESPONSE:

indicated that a specific laboratory may have had a problem with matrix interferences with specific parts of the chromatograms since reported detection limits were significantly higher than the detection limits reported by the other participating laboratories and the recovery values were also not consistent with the data available from the other laboratories. These matrix interferences could be due in part to the waste that was used to generate the ash or to the incomplete combustion of the ash as supported by the concentration levels of various constituents in the unspiked ash.

EPA did not review any standards that were not in the proposed Third Thirds Rule, specifically, those that were promulgated in the First Thirds and Second Thirds Rule and the Solvent Rule. Changes occurred primarily when EPA reevaluated cases where the HWTC study reported higher detection limits than those used by EPA to calculate standards. Although EPA had generally used the highest of the set of up to 14 incineration ash detection limits as the basis of the proposed standards, some exceptions had been made in the case of outliers and in cases where EPA believed a particular raw waste matrix best represented the waste code in question. In reviewing the HWTC study information, EPA reexamined those exceptions where the detection limit fell significantly below HWTC's reported detection limits and where there were anomalously high or low recoveries.

COMMENT NUMBER: 1-D-3 (continued)
DOCKET NUMBER: LD12-0015C
COMMENTER: Ross Environmental Services, Inc.
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

EPA had also published a report entitled "USEPA Method Study 36: SW-846 Methods 8270/3510 GC/MS Method for Semivolatile Organics: Capillary Column Technique; Separatory Funnel Liquid-Liquid Extraction," EPA/600/S4-89/010. This study documents analytical problems with several analytes for which Third Thirds standards were proposed. These analytes also were noted as problems in the HWTC study. HWTC also presented the results of this study in their comment.

Based on all the information evaluated from the HWTC study and EPA's Method 36 Study, and the 14 incineration test burns, the standards for the compounds listed in Table 1 were changed from the proposed rule. Below is the explanation of why these standards were changed.

Concentration-based standards for twelve U and P constituents (acetone, chloromethane, 4,4'-methylene bis(2-chloroaniline) 1,4-dioxane, ethyl acetate, ethyl ether, methyl ethyl ketone, N-nitrosopiperidine, N-nitrosopyrrolidine, 5-nitro-o-toluidine, N-nitrosodi-n-butylamine, and acrylonitrile) were revised to reflect detection levels in different wastes because the matrices used to generate the proposed standards were ash from burns of phthalate waste (K024), disulfoton wastes (K037), acetonitrile/acrylonitrile wastes (K011, K013, and K014), all unique matrices. Acetone, chloromethane, 1,4-dioxane, ethyl acetate, acrylonitrile, ethyl ether, and methyl ethyl ketone are volatile organics while K024 and K037 raw wastes, from which proposed standards for some of these compounds were derived, are high in semivolatile compounds such as

COMMENT NUMBER: 1-D-3 (continued)

DOCKET NUMBER: LD12-00150

COMMENTER: Ross Environmental Services, Inc.

ISSUE: General BDAT Aspects

SUBISSUE: PQLs

RESPONSE:

PNA's. The acetonitrile/acrylonitrile wastes (K011, K013, and K014) contain volatile organics; however, it is considered a unique matrix that may not be appropriate for transfer for U and P waste codes. EPA chose to base the promulgated standards on a matrices such as incineration ash from wood-preserving wastes (K001-PCP and creosote), from ethylene dichloride and other mixed wastes (K019 incineration test), or from veterinary pharmaceutical wastes (K102) because these are complex matrices with high concentrations of many organic compounds: volatiles, semivolatiles, chlorinateds, and others, and, consequently, are particularly difficult to analyze so that detection limits from these compounds are particularly achievable for U and P wastes and multi-source leachate nonwastewaters.

N-nitrosopiperidine, N-nitrosopyrrolidine, 5-nitro-o-toluidine, 4,4'-methylene bis(2-chloroaniline), and N-nitrosodi-n-butylamine proposed standards came from the phthalates (K024) waste matrix: the promulgated standards derive from detection levels found in the wood preserving waste (K001-PCP) burn, whose value as a source of data is discussed above.

Because the detection limits reported in the HWTC study for vinyl chloride lies well above the detection limit EPA used to develop a concentration-based standard for this waste, EPA is promulgating a higher concentration-based standard. The promulgated standard for vinyl chloride reflects the choice of a different and higher detection limit, this one from the ethylene dichloride (K019) waste matrix.

COMMENT NUMBER: 1-D-3 (continued)
DOCKET NUMBER: LD12-00150
COMMENTER: Ross Environmental Services, Inc.
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

For acrolein, acetonitrile, 3, 3'-dichlorobenzidine, p-dimethylaminoazobenzidine, chlorobenzilate, 2-naphthylamine, and cyclohexanone, the commenter reported such drastic detection limit discrepancies and/or extreme recoveries that EPA believes these analytes belong in the category of those not amenable to quantification. Therefore, a treatment method will be promulgated instead of a revised concentration-based nonwastewater treatment standard.

For 2-chloro-1,3 butadiene, the commenter reported zero recoveries for several sets of replicates and extremely variable recoveries for another. EPA's own experience in quantifying 2-chloro-1,3 butadiene led the Agency to promulgate a method of treatment for 2-chloro-1,3 butadiene rather than a concentration-based standard as proposed.

The Third Thirds proposed rule had solicited comment on whether benzal chloride in waste treatment residual matrices could be routinely quantified. The Agency had believed that benzal chloride was too unstable in water to be routinely quantified. No specific information demonstrating successful measurement of benzal chloride were submitted during the comment period. EPA is thus promulgating incineration as a technology-based standard for benzal chloride due to its instability in water instead of the proposed concentration-based standard. (Note that EPA is promulgating as proposed the concentration-based standard for benzal chloride as a constituent of K015 since EPA has analytical data for the untreated K015 wastes and the treatment residuals from incineration of this waste.)

COMMENT NUMBER: 1-D-3 (continued)
DOCKET NUMBER: LD12-00150
COMMENTER: Ross Environmental Services, Inc.
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

EPA also changed several standards in response to information in a recently released EPA Office of Research and Development (ORD) study, EPA/600/S4-89-010, "USEPA Method Study 36: SW-846 Methods 8270/3510 GC/MS Method for Semivolatile Organics: Capillary Column Technique; Separatory Funnel-Liquid-Liquid Extraction," (hereafter referred to as EPA's Method Study 36). This study evaluates the analytical methods most commonly used to quantify semivolatile analytes. "Semivolatiles" are a category of organic chemical including more than half of the compounds regulated in this rule. Although this study was carried out in support of the RCRA ground-water monitoring regulations and consequently looked only at aqueous matrices rather than at the incinerator ash matrices used to develop these nonwastewater concentration-based standards, the study documents such serious analytical problems with several Third Thirds analytes that EPA has chosen to promulgate incineration as a treatment standard rather than the proposed concentration-based standards. These analytes are: aramite, benzenethiol, phthalic anhydride, dibenzo(a,e) pyrene, dibenzo(a,i)pyrene, p-benzoquinone, hexachlorocyclopentadine, hexachlorophene, 1,4-naphthoquinone, 1-naphthylamine, N-nitrosodimethylamine, pentachloroethane, resorcinol, and tris(2,3-dibromophosphate).

This study determined how reliably these analytes can be quantified in aqueous matrices by examining the recoveries obtained and the precision achieved over the course of multiple analyses by several laboratories. Statistical analysis indicated that the recovery data for the analytes listed above were so unrealistically high or low that EPA,

COMMENT NUMBER: 1-D-3 (continued)
DOCKET NUMBER: LD12-00150
COMMENTER: Ross Environmental Services, Inc.
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

in the study, has declined to recommend the use of SW-846 methods 3510/8270 for quantifying these analytes in ground-water monitoring at RCRA-permitted facilities.

In promulgating the Third final rule, EPA chose to incorporate this recommendation about the severity of the problems associated with SW-846 methods 3510/8270 and thus move these analytes into the category of those compounds to be regulated with technology-based standards. The reason for this decision is that the study documents significant problems with GC/MS (gas chromatography/mass spectrometry which is the technique used almost exclusively to quantify organic compounds in all environmental samples and which is the basis not only of SW-846 8270, but of most other SW-846 methods for organic analytes) which are common to most methods used to quantify these compounds.

However, EPA makes one exception to its decision to promulgate methods as standards for those analytes recommended for deletion from methods 3510 plus 8270 in this ORD study. Since EPA has specific analytical data on the incineration of Dinoseb and since the data was of sufficient QA/QC, EPA is promulgating the concentration-based Dinoseb standards as proposed.

In reviewing its own data, EPA also decided that inadequate documentation exists demonstrating successful quantification of cis- and trans-1,2-dichloro-3-butene. Considering this, together with the

COMMENT NUMBER: 1-D-3 (continued)
DOCKET NUMBER: LD12-00150
COMMENTER: Ross Environmental Services, Inc.
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

problems in quantifying these two as a pair because their widely different boiling points complicate their behavior in the GC/MS apparatus, EPA is promulgating incineration as a method rather than the proposed concentration-based standard.

As noted earlier, The HWTC comment also included calculations of treatment standards based on PQLs. In the HWTC comment, PQLs were defined as five times the method detection limit. HWTC's methodology to calculate treatment standards is the PQL times the accuracy-correction factor (as calculated from the average recovery values) times the variability factor. EPA has published its methodology to calculate treatment standards as the detection limit or concentration level (if detected) times the accuracy correction factor times the variability factor. This methodology was published as part of the First and Second Thirds Final Rules. The Agency did not receive any substantial comments concerning the methodology used to calculate the treatment standards.

In addition, EPA used the definitions for method detection limit and practical quantification limits as published in the proposed revisions to the September 1986 edition of Test Methods for Evaluating Solid Waste (also referred to as SW-846). In this document the Agency defined method detection limit as "the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero." Practical quantification limits (PQLs) are defined as "the lowest level of qualification that the Agency believes a competent laboratory can be expected to reliably achieve."

COMMENT NUMBER: 1-D-3 (continued)

DOCKET NUMBER: LD12-00150

COMMENTER: Ross Environmental Services, Inc.

ISSUE: General BDAT Aspects

SUBISSUE: PQLs

RESPONSE:

The PQLs published in SW-846 were established to provide a guidance for the analysis of waste samples by acting as minimum performance criteria. Thus, PQLs do not necessarily represent the lowest limits of analytical performance achievable for any given waste. Detection limits are the lowest limit that can be quantified for a given constituent in a given waste.

The PQLs in SW-846 were not developed for a specific waste matrix. PQLs are presented for groundwater and low-level soil. Correction factors are given for other matrices such as high level soil and non-water miscible waste. Correction factors for treatment residuals such as incinerator ash are not given. Detection limits and PQLs are directly related to the constituent of interest and to the amount of interferences that are present in different waste matrices, therefore, detection limits and PQLs are generally significantly lower for treatment residuals than for untreated waste.

In some cases detection limits and PQLs by their definition in SW-846 can be equal since detection limits are the lowest level that can be quantified for a constituent and PQLs are defined as the lowest level that can be achieved reliably. PQLs are not defined as a factor or multiple of the detection limit. Therefore, data can be reported below a PQL level. Data should not be reported below the detection limit achieved for the specific constituent for a specific matrix. If PQLs were presented for data submitted for this rule, as a factor of the

COMMENT NUMBER: 1-D-3 (continued)
DOCKET NUMBER: LD12-00150
COMMENTER: Ross Environmental Services, Inc.
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

detection limit, then the detection limit information was used to assess the data.

The standards promulgated in the Third Third final rule are derived from detection limits achieved from studies of specific "F" or "K" waste or from the incineration of chemicals listed for specific "U" or "P" wastes or of a similar waste when the treatment standards are transferred. Since the detection limits used to derive the standards are based on the detection limits achieved by the laboratory that analyzed the sample, the Agency believes that other laboratories can achieve the same detection limits. In cases where more than one set of data were used to develop the treatment standard, the highest detection limit was usually selected as the basis for the treatment standard. Therefore, the resulting treatment standards reflect the best level of analytical performance that is achievable for the waste.

The Agency does not plan to change its methodology for calculating treatment standards. As a result, only information on detection limits and recovery values were evaluated and used to assess the proposed standards. The Agency did not use any information presented in the HWTC study concerning practical quantification limits to recalculate the standards to be promulgated for the U and P waste codes and for multi-source leachate nonwastewaters. In addition, EPA did not reevaluate standards that were promulgated for wastes under the solvents rule, the First Thirds Rule or the Second Thirds Rule.

Table 1 Summary of the Volatile and Semivolatile Constituents with Promulgated Standards Different Than the Proposed Rule

Changes in Concentration-Based Standards for U and P Waste Codes and for Volatile and Semivolatile Organic Constituents for F039 Nonwastewaters[a]

Code	Constituent
P047	4,6-Dinitro-o-cresol
P048	2,4-Dinitrophenol
U002	Acetone
U004	Acetophenone
U005	2-Acetylaminofluroene
U009	Acrylonitrile
U018	Benz(a)anthracene
U022	Benzo(a)pyrene
U043	Vinyl Chloride
U044	Chloroform
U045	Chloromethane
U050	Chrysene
U051	Naphthalene
U051	Pentachlorophenol
U051	Phenanthrene
U051	Pyrene
U051	Toluene
U051	Xylenes (total)
U063	Dibenz(a,h)anthracene
U075	Dichlorodifluoromethane
U076	1,1-Dichloroethane
U077	1,2-Dichloroethane
U078	1,1-Dichloroethylene
U079	trans-1,2-Dichloroethylene
U080	Methylene chloride
U083	1,2-Dichloropropane
U084	cis-1,3-Dichloropropene
U084	trans-1,3-Dichloropropene
U108	1,4-Dioxane
U112	Ethyl acetate
U117	Ethyl ether
U120	Fluoranthene
U131	Hexachloroethane
U137	Indeno(1,2,3-c,d)pyrene
U157	3-Methylcholanthrene

Table 1 (continued)

Code	Constituent
U158	4,4'-Methylenebis (2-chloroaniline)
U159	Methyl ethyl ketone
U165	Naphthalene
U170	4-Nitrophenol
U172	N-Nitrosodi-n-butylamine
U179	N-Nitroso-piperidine
U180	N-Nitroso-pyrrolidine
U181	5-Nitro-o-toluidine
U208	1,1,1,2-Tetrachloroethane
U209	1,1,2,2-Tetrachloroethane
U210	Tetrachloroethene
U211	Carbon tetrachloride
U226	1,1,1-Trichloroethane
U227	1,1,2-Trichloroethane
U239	Xylenes (total)
U243	Hexachloropropene
F039	Acenaphthene
F039	Anthracene
F039	Benzo(g,h,i)perylene
F039	Bromodichloro methane
F039	Butyl benzl phthalate
F039	Chlorodibromomethane
F039	Fluorene

[a] The changes in concentration-based standards occurred because:

(1) EPA decided not to base concentration-based standards for U and P nonwastewaters and F039 nonwastewaters on data from three of the fourteen test burns and to recalculate concentration-based standards for promulgation with data from other test burns involving matrices more similar to U and P matrices.

(2) EPA reevaluated the use of recovery factors in calculating concentration-bases standards. EPA had calculated the proposed concentration-based standard for halogenated aliphatics, aromatics, and polynuclear aromatics using an averaged recovery factor from several of the spiked constituents. The standards for the rest of the U wastes were calculated using a recovery factor from a single constituent. To ensure consistency among all concentration-based standards, EPA chose to recalculate the standards using a single constituent recovery factor.

Table 1 (continued)

Changes in Concentration-Based Standards to Technology-Based Standards for U and P Nonwastewaters for Volatile and Semivolatile Organics

Revised for Codes:	Constituent
U003	Acetonitrile
P003	Acrolein
U017	Benzal chloride
U074	1,4-Dichloro-2-butene (cis and trans)
U197	p-Benzoquinone
U038	Chlorobenzilate
U057	Cyclohexanone
U073	3,3'-Dichlorobenzidine
U093	p-Dimethylaminoazobenzene
U130	Hexachlorocyclopentadiene
U132	Hexachlorophene
U166	1,4-Naphthoquinone
U167	1-Naphthylamine
U168	2-Naphthylamine
P082	N-Nitrosodimethylamine
U184	Pentachloroethane
U201	Resorcinol

Table 1 (continued)

Volatile and Semivolatile Organic Constituents for Which Concentration-Based Standards Have Been Dropped for F039 Nonwastewaters

Acetonitrile (U003)
Acrolein (P003)
Acrylamide
4-Aminobiphenyl
2-Chloro-1,3-butadiene
1,4-Dichloro-2-butene (cis and trans) (U074)
Aramite
Benzal chloride (U017)
Benzenethiol
p-Benzoquinone (U197)
Chlorobenzilate (U038)
Cyclohexanone (U057)
Dibenzo(a,e)pyrene
Dibenzo (a,i) pyrene
3,3'-Dichlorobenzidine (U073)
- p-Dimethylaminobenzene (U093)
Diphenylamine
Diphenylnitrosamine
Hexachlorocyclopentadiene (U130)
Hexachlorophene (U132)
Methanol
1,4-Naphthoquinone (U166)
1-Naphthylamine (U167)
2-Naphthylamine (U168)
N-Nitrosodimethylamine (P082)
Pentachloroethane (U184)
Phthalic anhydride
Resorcinol (U201)
Tris(2,3-dibromophosphate)

Comment Number: 1-D-4
Docket Number: LD12-00151
Commenter: Gulf Coast Waste Disposal Authority
Issue: General BDAT Aspects
Subissue: PQLs
Comment:

The Agency states that a variance from a treatment standard may be obtained if it is shown that the waste matrix interferes with the applicable SW-846 analytical method so that compliance cannot be demonstrated.

The Agency does not prescribe a procedure for obtaining a variance for obtaining relief from a standard for which compliance cannot be measured with available analytical methods. To avoid administrative problems in obtaining what should be a straightforward variance, EPA should specify the procedures that must be followed to obtain a treatability variance for analytical inability to measure at the prescribed level.

In section III.A.1.e.(3) of the proposed rule, the Agency describes the relationship between the practical quantitation limits (PQLs) published in *Test Methods for Evaluating Solid Wastes*, (SW-846), September 1986, and the BDAT standards, especially those that are based on detection limits. EPA states that when a facility believes that waste-specific treatment standards cannot be met because their laboratory is unable to achieve PQLs below the treatment standards on a specific waste residual, the facility may submit a petition for a variance from the treatment standards for that particular waste code. GCA supports this position, however, there is no specified procedure in SW-846 for determining a PQL. Furthermore, because the treatment standards are based on method detection limits (MDLs), not PQLs, the procedures used to estimate these limits do not consider either the quantification of the constituent of interest nor the interlaboratory component of analytical uncertainty.

In order to have the petition for variance for adjustment of a BDAT standard reflect analytical capabilities for a specific waste, EPA must provide a more explicit definition of the protocols that should be used to define the MDL or PQL for a specific waste matrix. The first step should be to define whether or not the standard should be based on detection (an MDL) or quantification (a PQL).

Comment Number: 1-D-4 continued
Docket Number: LD 12-00151
Commenter: Gulf Coast Waste Disposal Authority
Issue: General BDAT Aspects
Subissue: PQLs
Comment:

The problem of demonstrating compliance with treatment standards that are based on detectable levels of hazardous constituents is great for characteristic wastes and P and U wastes, which may exhibit a very wide range of matrices. They may consist of soil matrices, sludge matrices, or wastewaters. Although the Agency argues, with some merit, that for those nonwastewaters that have standards based on incineration the problems of matrix interference should be reduced, they are not eliminated. It is probable that some waste treaters, especially those that are treating characteristic, P, and U wastes, and multi-source leachate, may not be able to achieve those BDAT standards that are based on detection limits.

Since this result will require such treaters to apply for waste-specific standards, EPA should specify the procedure that is to be used to establish the waste/treatment-specific detection or quantitation limits. GCA recommends the following approach.

Since it is impractical for most waste treaters to develop an interlaboratory PQL, a quantitation level based on a single-laboratory study by the laboratory that is responsible for demonstrating continued compliance with the standard for the waste in question should be acceptable. GCA believes that the protocol provided in SW-846 for estimating the MDL should be used to establish the detection (not quantitation) limit for the treated waste matrix. This procedure is an accepted and proven basis for estimating the ability to detect the presence of a chemical in a waste at a 99 percent confidence level. The MDL measured for a specific waste can then be converted to a quantification limit (PQL) by multiplying it by 10. This is the the procedure that the Agency has typically used to establish PQLs.

COMMENT NUMBER: 1-D-4
DOCKET NUMBER: LD12-00151
COMMENTER: Gulf Coast Waste Disposal Authority
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

EPA has published its methodology to calculate treatment standards as the detection limit or concentration level (if detected) times the accuracy correction factor times the variability factor. This methodology was published as part of the First and Second Thirds Final Rules together with the treatment standards. The Agency did not receive any substantial comments concerning the methodology used to calculate the treatment standards.

EPA used the definitions for method detection limit and practical quantification limits as published in the proposed revisions to the September 1986 edition of Test Methods for Evaluating Solid Waste (also referred to as SW-846). In this document the Agency defined method detection limit as "the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero." Practical quantification limits (PQLs) are defined as "the lowest level of qualification that the Agency believes a competent laboratory can be expected to reliably achieve."

The PQLs published in SW-846 were established to provide a guidance for the analysis of waste samples by acting as minimum performance criteria. Thus, PQLs do not necessarily represent the lowest limits of analytical performance achievable for any given waste. Detection limits are the lowest limit that can be quantified for a given constituent in a given waste. Furthermore, PQL's have no regulatory significance.

The PQLs in SW-846 were not developed for a specific waste matrix. PQLs are presented for groundwater and low-level soil. Correction

COMMENT NUMBER: 1-D-4 (continued)
DOCKET NUMBER: LD12-00151
COMMENTER: Gulf Coast Waste Disposal Authority
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

factors are given for other matrices such as high level soil and non-water miscible waste. Correction factors for treatment residuals such as incinerator ash are not given. Detection limits and PQLs are directly related to the constituent of interest and to the amount of interferences that are present in different waste matrices, therefore, detection limits and PQLs are generally significantly lower for treatment residuals than for untreated waste.

In some cases detection limits and PQLs by their definition in SW-846 can be equal since detection limits are the lowest level that can be quantified for a constituent and PQLs are defined as the lowest level that can be achieved reliably. PQLs are not defined as a factor or multiple of the detection limit. Therefore, data can be reported below a PQL level. Data should not be reported below the detection limit achieved for the specific constituent for a specific matrix. If PQLs were presented for data submitted for this rule, as a factor of the detection limit, then the detection limit information was used to assess the data.

The standards promulgated in the Third Third final rule are derived from detection limits achieved from studies of specific "F" or "K" waste or from the incineration of chemicals listed for specific "U" or "P" wastes or of a similar waste when the treatment standards are transferred. Since the detection limits used to derive the standards are based on the detection limits achieved by the laboratory that analyzed the sample, the

COMMENT NUMBER: 1-D-4 (continued)
DOCKET NUMBER: LD12-00151
COMMENTER: Gulf Coast Waste Disposal Authority
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

Agency believes that other laboratories can achieve the same detection limits. In cases where more than one set of data were used to develop the treatment standard, the highest detection limit was usually selected as the basis for the treatment standard. Therefore, the resulting treatment standards reflect the best level of analytical performance that is achievable for the waste.

The Agency does not plan to change its methodology for calculating treatment standards. As a result, only information on detection limits and recovery values were evaluated and used to assess the proposed standards. The Agency did not use any information presented in the HWTC study concerning practical quantification limits to recalculate the standards to be promulgated for the U and P waste codes and for multi-source leachate nonwastewaters. In addition, EPA did not reevaluate standards that were promulgated for wastes under the solvents rule, the First Thirds Rule or the Second Thirds Rule.

Several commenters, however, raised the issue that, in certain cases, analytical problems (i.e., difficulties in reliable quantitation at detection limits near the concentration-based treatment standards) may prevent demonstrating compliance with the proposed treatment standards for Third Third wastes. They also pointed out that this same problem already may exist for some First and Second Third wastes.

COMMENT NUMBER: 1-D-4 (continued)
DOCKET NUMBER: LD12-00151
COMMENTER: Gulf Coast Waste Disposal Authority
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

EPA has examined the data submitted to the Agency in support of these comments. While the Agency does not believe that the currently available data is conclusive, EPA acknowledges that there can be situations where lack of available analytical methods may prevent demonstration of compliance with the treatment standards.

EPA is dealing with this potential problem in a number of ways. First, EPA has examined detection limit data submitted by the commenters and compared them to the data used to develop the proposed standards. After a thorough technical evaluation, the Agency incorporated a portion of these data into the promulgated standards in today's rule. In addition, the Agency has reevaluated the existing BDAT data generated by the Agency, the transfer procedures used for some of the wastes, and recently available information and data on recovery of the BDAT organic constituents. Thus, EPA concurred with the commenters and concluded that many of the other proposed concentration-based treatment standards may not be achievable. As a result, EPA is promulgating revised standards for some organics in nonwastewaters that are higher than the proposed standards. In doing so, the majority of the commenters' concerns over achievability are no longer applicable. (Note: The Agency is continuing to study this issue and, if warranted, may adjust other standards, including some for First and Second Third wastes, after sufficient public notice.)

COMMENT NUMBER: 1-D-4 (continued)

DOCKET NUMBER: LD12-00151

COMMENTER: Gulf Coast Waste Disposal Authority

ISSUE: General BDAT Aspects

SUBISSUE: PQLs

RESPONSE:

Second, in certain situations where compliance with a standard cannot be demonstrated for a particular waste due to problems with analytical detection limits and where the treatment technology employed was considered by the Agency to be BDAT, the Agency has decided that reliance upon the treatability variance petition process would place an unnecessary burden on both the regulated and regulatory communities. The Agency believes that where a waste has been treated with a combustion BDAT process (i.e., incineration or fuel substitution unit), and if the person has made a good faith effort to achieve maximum analytical sensitivity, the Agency will consider the person to have demonstrated compliance with the treatment standard.

In order to demonstrate compliance in such cases, the person will have had to make a good faith effort to demonstrate that the analyte of concern is not present in the waste at, or above, the treatment standard. To provide a more concrete basis for making such demonstrations, EPA intends to develop and issue guidance on what constitutes a good faith effort to achieve such analytical sensitivity within the next few months. This guidance is anticipated to be available at or near the effective date for the treatment standards.

In developing the treatment standards in today's rule, the Agency selected the treatment data (i.e., detection limit data) that best represented what the majority of wastes could meet. (Note: Most of these data were from incinerator units that were considered well-designed

COMMENT NUMBER: 1-D-4 (continued)
DOCKET NUMBER: LD12-00151
COMMENTER: Gulf Coast Waste Disposal Authority
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

and well-operated.) However, the Agency rejected detection limit data for some wastes, because the Agency determined that these wastes were not necessarily representative of the treatability of other wastes. After reexamination of all of the available detection limit data, the Agency has found that the majority of the detection limit data for these wastes will generally not exceed the promulgated treatment standards by more than one order of magnitude.

Thus, until this formal guidance is available, the Agency will therefore consider that, if an analytical sensitivity (i.e., detection limit) within an order of magnitude of the treatment standards has been achieved, compliance with the treatment standard will be considered to have been demonstrated provided the data represents the use of a combustion process (i.e., restricted to incineration or fuel substitution in a unit in compliance with all applicable technical operating requirements under 40 CFR 264 Subpart O and 265 Subpart O. Thus, it is likely that the combustion unit is being operated properly). The Agency believes that this is consistent with RCRA section 3304(m), in that, as an alternative to specifying a concentration-based standard for these wastes, the Agency could have promulgated a method of treatment specifying the use of incineration or fuel substitution.

EPA is thus amending section 268.7 and 268.43 to state that where a treatment standard for organics in nonwastewaters is based on a combustion technology, and a waste has been treated using that treatment

COMMENT NUMBER: 1-D-4 (continued)
DOCKET NUMBER: LD12-00151
COMMENTER: Gulf Coast Waste Disposal Authority
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

method (i.e., restricted to incineration or fuel substitution in units operated in accordance with the technical operating requirements of 40 CFR 264 Subpart O and 265 Subpart O), if a good faith effort has been made to analytically demonstrate compliance with the treatment standard, the treatment facility may certify compliance with the standard based on the data obtained. This includes all waste codes in First, Second, and Third Thirds where standards for organics in nonwastewaters are based on combustion processes or were transferred from wastes based on combustion processes. The commenter requested that EPA define MDL's and PQL's more vigorously than at present: EPA is considering developing such guidance within the next several months.

The Agency also points out that in cases where a facility believes that waste-specific treatment standards cannot be met because their laboratory is still unable to achieve detection limits below the treatment standards on specific treatment residuals, and: 1) the facility complies with all the other conditions mentioned above; or 2) a facility utilizes a combustion technology other than incineration or fuel substitution; or 3) a facility utilizes a noncombustion technology that can be demonstrated to be equivalent, the facility may submit a petition for a variance from the treatment standards for that particular waste code (EPA construes 40 CFR 268.44 as encompassing such petitions). The facility must demonstrate that the analyses are in compliance with all other BDAT QA/QC provisions (as outlined in the BDAT General Quality Assurance Project Plan (EPA/530-SW-87-011, March 1987). Moreover, the petitioner must also demonstrate that the treatment process is a well-designed and well-operated BDAT process.

1

Comment Number: 1-D-5
Docket Number: LD12-00159
Commenter: Waste Management, Inc. and Chemical Waste Mgmt, Inc.
Issue: General BDAT Aspects
Subissue: PQLs
Comment:

A. Practical Quantitation Levels (54 Fed. Reg. at 48,385)

1. Definition of Practical Quantitation Limits

In its discussion of the relationship of treatment standards to PQLs, EPA quoted the definition of PQL from SW-846 as "the lowest level of quantification that the Agency believes a competent laboratory can be expected to reliably achieve." Missing from this quotation is the critical language in SW-846: ". . . within the specified limits of precision and accuracy during routine laboratory operating conditions." SW 846, 3rd Ed, ONE-9.

This language cannot be omitted. As quoted by EPA, the definition of PQL suggests that a clear, specific mechanism is available to evaluate a laboratory as being "competent." A national certification program to determine competency does not exist. Without specific guidance from EPA, any laboratory would consider itself to be competent.

WMI also suggests that in the preamble to the final rule, EPA should refer to the clear discussion and example of determining precision and accuracy found in 54 Fed. Reg. at 22,100 (May 22, 1989), which must be used for generation of the PQL.

Comment Number: 1-D-5 continued
Docket Number: LD12-00159
Commenter: Waste Mgmt, Inc. and Chemical Waste Mgmt., Inc.
Issue: General BDAT Aspects
Subissue: PQL 4
Comment:

Moreover, EPA should specify a procedure for adequately determining method detection limits (MDLs) and the resultant factored Practical Quantitation Limits. Most laboratories determine MDLs and PQLs from analytical runs on one day, with one instrument and one operator. This practice does not take into consideration the variability of data generated by several analysts on different days using different instruments or the matrix variation or sampling variation. Such variability must be taken into account.

2. Achievability of PQLs and BDAT

EPA has also quoted SW-846's recognition that "[s]ample PQLs are highly matrix-dependent. The PQLs listed herein are provided for guidance and may not always be achievable." 54 Fed. Reg. at 48,385, quoting SW-846, September 1986, Table 2, pp. 8250-5. From this point, it follows that:

(1) when the BDAT criteria are below or near the PQL, the BDAT level will not be achievable; and

(2) the monitoring of achievement of treatment standards can be done only when the BDAT is above the PQL.

Comment Number: 1-D5 continued
Docket Number: LD12-00159
Commenter: Waste Mgmt. Inc. and Chemical Waste Mgmt. Inc.
Issue: General BDAT Aspects
Subissue: PQLs
Comment:

It is apparent that the EPA has not followed the quoted principle to these logical conclusions when evaluating BDAT. Review of the Third-Third standards reveals that nearly 35% of these BDATs are below SW-846 GC/MS PQLs for all matrices measured. Moreover, 9% of the BDATs were set on compounds for which there are no SW-846 GC/MS methods for identification, quantification or verification.

3. Determination of Method Detection Limits

EPA has explained that, in SW-846, "[t]he discussion further defines PQLs as the method detection limit in reagent water (from Table 1, pp. 8250-2, 8250-3, and 8250-4) multiplied by a matrix-dependent factor that was estimated for four matrices (Table 2, p. 8250-5)." 54 Fed. Reg. at 48,385. This statement prompts four concerns.

First, the procedure for determining the MDL is suitable for a single channel instrument such as a gas chromatograph. It is not suitable for a multi-channel instrument such as a GC/MS because when the ion abundance for the quantification ion is present at the lowest amount measurable, the confirmatory ions are not detectable.

Second, a specific procedure for MDL determination is lacking. By leaving the process up to interpretation, laboratories will generate the values in a variety of ways.

Comment Number: 1-D-5 continued
Docket Number: LD12-00159
Commenter: Waste Mgmt. Inc. and Chemical Waste Mgmt. Inc.
Issue: General BDAT Aspects
Subissue: PQLs
Comment:

Third, EPA presents no supporting evidence for the matrix factors. Arbitrary selection of values allows laboratories to choose different arbitrary values based on "their experience."

Fourth, the use of MDLs in reagent water has no applicability to the instances where "the corresponding treatment standards for these constituents are based on an analysis of total constituent concentrations in a representative sample of the treated waste." 54 Fed. Reg. at 48,384. The MDLs for destructive technology must be determined in the treated waste.

4. Interferences in Waste Matrices

As EPA states, "the PQLs are directly related to the amount of interferences that are present in the different waste matrices." 54 Fed. Reg. at 48,385. In addition, the validity of a PQL is dependent on the ability of the laboratory to demonstrate defensible analysis at the limit in the given waste matrix. The lack of recovery of a known amount of the constituent will also affect the value of the PQL. A specific example is incinerator ash that is a clean matrix but highly reactive, yielding low recovery and thus high PQLs.

Other "derived from" treatment residuals may also be more complex and more difficult to analyze than the waste itself. No consideration of these residuals is evident EPA's discussion on matrix factors.

Comment Number: 1-D-5 continued
Docket Number: LD12-00159
Commenter: Waste Mgmt, Inc. and Chemical Waste Mgmt, Inc.
Issue: General BDAT Aspects
Subissue: PQLs
Comment:

5. Matrix-Dependent Correction Factors

In its proposal, EPA explains that "matrix dependent correction factors . . . do not specifically apply to any particular treatment residuals (i.e., only correction factors for matrices identified as ground water, low-level soil, high-level soil, and non-water miscible waste." 54 Fed. Reg. at 48,385.

WMI urges EPA to specify chemical and physical characteristics for use in categorization of matrices. For example, all soils are not equal. Presumably, the "soil" used in EPA's study was an actual soil containing organic matter and mineral matter. In that case, the adsorption of semi-volatile organics would be related to the percentages of organic matter in the humic and fulvic fractions and to the amount and type of clay. From soil to soil, these components differ; therefore, the matrix-dependent correction factor is probably valid for only the soil specific used in the study.

Matrix-dependent factors do not yield analytical results. For example, a factor is used in a method for analyzing organic matter content in soils, but the method is only applicable to soils of a certain mineralogy from a certain geographic and climatic region.

No definition of "non-water miscible waste" is given.

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Comment Number: 1-D5 continued
Docket Number: LD12-00159
Commenter: Waste Mgmt. Inc. and Chemical Waste Mgmt. Inc.
Issue: General BDAT Aspects
Subissue: PQLs
Comment:

6. Revision of Correction Factors and MDLs

EPA announces that it is "currently modifying and expanding the matrix correction factors, as well as modifying the detection limits from which the PQLs are derived." 54 Fed. Reg. at 48,385. The regulated community should not be held to "standards" that are in essence "moving targets." The matrix factors, detection limits and procedures for their determination should be finalized before becoming requirements.

7. Achievability of Analytical Performance

WMI disagrees with EPA's conclusion that "the resulting treatment standards appropriately reflect the level of analytical performance achievable for that waste." To adequately represent various waste streams, the PQLs (MDLs) should be based on testing the applicable matrices, with the appropriate extraction and clean-up steps. Otherwise, the standards do not "appropriately reflect" the level of analytical performance achievable in a particular waste.

Comment Number: 1-D6 continued
Docket Number: LD12-00159
Commenter: Waste Mgmt, Inc. and Chemical Waste Mgmt. Inc.
Issue: General BDAT Aspects
Subissue: PQL 4
Comment:

8. Reliability of Data

WMI disagrees with EPA's assertion that "the laboratories used to develop the treatment standards are reliable and must maintain compliance with EPA's Quality Assurance/Quality Control requirements on a routine basis." 54 Fed. Reg. at 48,385. At this time, there are no mandatory QA/QC requirements other than those specifically found in RCRA required methods. Standards proposed on January 23, 1989 (54 Fed. Reg. at 3,212) have not been promulgated. Thus, there is no assurance that EPA's QA/QC procedures are routinely followed.

Even if CLP contractor laboratories were used in the development of the treatment standards, no such assurance exists. Usually, less than 10% of the data supplied under these contracts are evaluated for compliance to QA/QC criteria.

EPA should make the data quality objectives (DQOs) for these analytical projects available for review by the regulated community. Realistic detection limits are essential to thorough evaluation of the performance of a laboratory.

Comment Number: 1-D^5 continued
Docket Number: LD12-00159
Commenter: Waste Mgmt, Inc. and Chemical Waste Mgmt. Inc.
Issue: General BDAT Aspects
Subissue: PQLs
Comment:

9. BDAT Generic Quality Assurance Project Plan

EPA states that to obtain a variance because PQLs are below treatment standards, a "facility must demonstrate that the analyses are in compliance with all other BDAT QA/QC provisions (as outlined in the BDAT Generic Quality Assurance Project Plan)." 54 Fed. Reg. at 48,385. There is no discussion of PQLs in the BDAT Generic QAPP, however. Instrument detection limits are mentioned but no relationship to PQLs is described. This deficiency needs to be addressed.

The BDAT Generic QAPP also specifies that the recovery data will be used to adjust the values for the unspiked samples. The defensibility of the data is highly questionable if the spike recovery does not meet an acceptance criteria based on repetitive spikes at a level determined to be recoverable. A significantly low or high recovery does not preempt the possibility of operator error or method applicability.

Finally, the BDAT QAPP does not enumerate any surrogate recovery criteria. If any method not in SW-846 is used following this guidance, the results from that method will be highly questionable.

Comment Number: 1-D5 continued
Docket Number: LD12-00159
Commenter: Waste Mgmt., Inc. and Chemical Waste Mgmt, Inc.
Issue: General BDAT Aspects
Subissue: PQLs
Comment:

10. Analytical Methods

EPA notes that "The Agency may use analytical methods that are not specifically identified in SW-846." 54 Fed. Reg. at 48,385. WMI objects to this statement and to any reliance by the Agency on non-standardized methods in developing treatment standards.

The Agency should not allow itself or the regulated community to use non-standard methods for the RCRA program. The only way to achieve a reasonable level of quality in data is to impose maximum standardization of methods and adopt the quality assurance standards proposed on January 23, 1989 in final form. Without standardized methods, treatment standards cannot be properly implemented or enforced.

Data comparability is dependent upon using the same method or, at the very least, ensuring the statistical characteristics of the databases in question have no significant differences. Unless treatment standards are developed using required extraction techniques and published standard methods, there is no reason to assume that laboratories used by the regulated community will be able to demonstrate compliance with the treatment standards. At the least, EPA must identify and publish for examination by the public any alternative methods used in developing the treatment standards.

Comment Number: 1-D^5 continued
Docket Number: LD12-00159
Commenter: Waste Mgmt, Inc. and Chemical Waste Mgmt Inc.
Issue: General BDAT Aspects
Subissue: PQLs
Comment:

11. Reliability and Correction Factors

In the preamble, EPA explains that "the data (the average detection limit) are adjusted through use of the variability factor (typically 2.8) and a correction for recovery of a spiked analyte (or surrogate)." 54 Fed. Reg. at 48,386. Variability factors and correction factors should also be taken into consideration when determining PQLs.

The adjustment described is not in accordance with EPA's standard methods, however. The analytical methods in SW-846 do not allow for adjustment of concentration based on recoveries of surrogates. If the surrogate recovery is greater than 100%, this technique would require the analyst to lower the measured amount of a target analyte by the same percentage. Spike recoveries and surrogates must be controlled but should not be used to factor other constituents.

Finally, the averaged detection limit adjusted by various factors may not necessarily satisfy the definition of PQL in SW-846, 3rd Edition.

COMMENT NUMBER: 1-D-5
DOCKET NUMBER: LD12-00159
COMMENTER: Waste Management, Inc. and
Chemical Waste Management, Inc.
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

1. DEFINITION OF PRACTICAL QUALIFICATION LIMITS

EPA used the definitions for method detection limit and practical quantification limits as published in the proposed revisions to the September 1986 edition of Test Methods for Evaluating Solid Waste (also referred to as SW-846). In this document the Agency defined method detection limit as "the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero." Practical quantification limits (PQLs) are defined as "the lowest level of quantification that the Agency believes a competent laboratory can be expected to reliably achieve."

The PQLs published in SW-846 were established to provide a guidance for the analysis of waste samples by acting as minimum performance criteria. Thus, PQLs do not necessarily represent the lowest limits of analytical performance achievable for any given waste. Detection limits are the lowest limit that can be quantified for a given constituent in a given waste. EPA reiterates that PQLs are minimum measures of analytical laboratory performance, as defined in SW-846, for the use of laboratories in assessing their own performance in terms of success in reaching low levels of certain analytes in certain matrices. Outside of this function of providing a quantitative definition of the boundaries between poor and competent analytical performance, PQLs have no regulatory power.

COMMENT NUMBER: 1-D-5 (continued)
DOCKET NUMBER: LD12-00159
COMMENTER: Waste Management, Inc. and
Chemical Waste Management, Inc.
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

EPA acknowledges the commenter's concern on specifications for adequately determining method detection limits (MDLs). EPA will take this concern into consideration when it is developing its guidance on what constitutes a "good faith effort to achieve analytical sensitivity" that is needed to demonstrate that the analyte of concern is not present in the waste at, or above, the treatment standard.

2. ACHIEVABILITY OF PQLs AND BDAT

EPA believes that all of the constituents for which concentration-based standards are being promulgated can be analyzed for using SW-846 methods at the level set for the treatment standard. EPA did reevaluate many of the proposed treatment standards, especially those for U and P and multi-source nonwastewater leachates. Based on information received during the comment period and based on a study recently released by EPA Office of Research and Development (ORD), EPA/600/S4-90-010, "USEPA Method Study 36: SW-846 Methods 8270/3510 GC/MS Method for Semivolatile Organics: Capillary Column Technique; Separatory Funnel Liquid-Liquid Extraction," (hereafter referred to as EPA's Method Study 36), EPA has revised several of the treatment standards, especially those which were determined to have significant analytical problems associated with detection limits and recoveries.

COMMENT NUMBER: 1-D-5 (continued)
DOCKET NUMBER: LD12-00159
COMMENTER: Waste Management, Inc. and
Chemical Waste Management, Inc.
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

3. DETERMINATION OF METHOD DETECTION LIMITS

EPA acknowledges the commenter's concerns in having a specific procedure for determining MDLs. SW-846 does give guidance on developing MDLs. In addition, EPA will take this concern into consideration when it is developing its guidance on what constitutes a "good faith effort to achieve analytical sensitivity."

4. INTERFERENCES IN WASTE MATRIX

The PQLs in SW-846 were not developed for a specific waste matrix. PQLs are presented for groundwater and low-level soil. Correction factors are given for other matrices such as high level soil and non-water miscible waste. Correction factors for treatment residuals such as incinerator ash are not given. Detection limits and PQLs are directly related to the constituent of interest and to the amount of interferences that are present in different waste matrices, therefore, detection limits and PQLs are generally significantly lower for treatment residuals than for untreated waste.

In some cases detection limits and PQLs by their definition in SW-846 can be equal since detection limits are the lowest level that can be quantified for a constituent and PQLs are defined as the lowest level that can be achieved reliably. PQLs are not defined as a factor or multiple of the detection limit. Therefore, data can be reported below a

COMMENT NUMBER: 1-D-5 (continued)
DOCKET NUMBER: LD12-00159
COMMENTER: Waste Management, Inc. and
Chemical Waste Management, Inc.
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

PQL level. Data should not be reported below the detection limit achieved for the specific constituent for a specific matrix. If PQLs were presented for data submitted for this rule, as a factor of the detection limit, then the detection limit information was used to assess the data.

5. MATRIX-DEPENDENT CORRECTION FACTORS

The standards promulgated in the Third Third final rule are derived from detection limits achieved from studies of specific "F" or "K" waste or from the incineration of chemicals listed for specific "U" or "P" wastes or of a similar waste when the treatment standards are transferred. Since the detection limits used to derive the standards are based on the detection limits achieved by the laboratory that analyzed the untreated waste samples and the treatment residuals, the Agency believes that other laboratories can achieve the same detection limits.

EPA did not base its standards on the analysis of "soils" but on actual treatment residuals from the technology specified as BDAT. In analyzing these residuals, the laboratories followed the procedures in SW-846 for "low-level soils" since the concentration of the various constituents should be at levels similar to those in low-level soils as compared to the untreated waste.

COMMENT NUMBER: 1-D-5 (continued)
DOCKET NUMBER: LD12-00159
COMMENTER: Waste Management, Inc. and
Chemical Waste Management, Inc.
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

The commenter states that no definition of "non-water miscible waste" is given in SW-846. This statement is not relevant since for each of the waste codes the waste that was treated is described in both the on-site engineering report for the treatment test and the background document for the specific waste code or the waste from which the performance data are transferred from is described in the background documents for each waste code.

6. REVISIONS OF CORRECTION FACTORS AND MDLs

Although EPA is planning on "modifying and expanding the matrix correction factors and expanding the matrix correction factors, as well as modifying the detection limits from which the PQLs are derived," these modifications will not affect the treatment standards that are being promulgated in the Third Thirds Rule. EPA believes that all of the constituents for which concentration-based standards are being set can be analyzed for at the level set for the treatment standards. These standards are not "moving targets."

EPA and the analytical community will continue to improve analytical equipment and procedures. As analytical procedures and equipment improve, detection limits should improve and be even lower than the detection limits on which the treatment standards are based.

COMMENT NUMBER: 1-D-5 (continued)

DOCKET NUMBER: LD12-00159

COMMENTER: Waste Management, Inc. and
Chemical Waste Management, Inc.

ISSUE: General BDAT Aspects

SUBISSUE: PQLs

RESPONSE:

7. ACHIEVABILITY OF ANALYTICAL PERFORMANCE

The treatment standards are either based on performance data available for the specific waste streams or are based on a waste that EPA believes is similar to the waste being regulated but is more difficult to treat and analyze. Therefore, EPA believes that all of the treatment standards do appropriately reflect the level of analytical performance achievable for each of the waste codes.

8. RELIABILITY OF DATA

The laboratories used to develop analytical data specifically for Land Disposal Restrictions Program followed EPA's QA/QC plan as outlined in the BDAT Generic Quality Assurance Project Plan. The Agency is confident that this methodology has resulted in treatment standards that accurately represent the performance of particular treatment standards.

EPA has also evaluated data submitted by industry to determine whether QA/QC data are available and meet the requirements laid out in both the EPA's QA/QC plan and the methodology published for both the First and Second Thirds Rule. Therefore, EPA believes that the data used to calculate the treatment standards are of known quality and have adequate QA/QC data. In addition, EPA has published all performance data used to set the treatment standards along with the associated QA/QC results in the background documents that are available for each of the waste codes.

COMMENT NUMBER: 1-D-5 (continued)
DOCKET NUMBER: LD12-00159
COMMENTER: Waste Management, Inc. and
Chemical Waste Management, Inc.
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

9. BDAT GENERIC QUALITY ASSURANCE PROJECT PLAN

EPA believes that there may be cases where the waste has been treated with a combustion BDAT process and the generator and/or treater has made a "good faith effort to achieve maximum analytical sensitivity" but compliances with the standard can not be demonstrated due to problems with analytical detection limits to provide a more concrete basis for making such demonstrations, EPA intends to develop and issue guidance on what constitutes a good faith effort to achieve such analytical sensitivity. This guidance is anticipated to be available at or near the effective date for the treatment standards. This guidance can then be used for generators when completing the analytical data needed to apply for a variance.

For the BDAT Program, EPA has decided that the recovery must be at least 20 percent for the data to be used for treatment standards. Recovery values greater than 100 percent were evaluated on a case-by-case basis. EPA decided to adjust the data for recovery so as not to penalize laboratories that are able to achieve good recoveries (i.e., recoveries near or above 100 percent). For example, there could be cases where the recoveries for the performance data used to set the treatment standard were low (i.e., near 20 percent) then the treatment standard could be set at the lower value if unadjusted values were used and laboratories that were able to achieve recoveries near 100 percent would not be able to meet the treatment standards. Therefore, to be

COMMENT NUMBER: 1-D-5 (continued)
DOCKET NUMBER: LD12-00159
COMMENTER: Waste Management, Inc. and
Chemical Waste Management, Inc.
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

conservative, EPA decided to adjust the data. This is stated in the methodology that was used to promulgate the First and Second Third Rule. EPA did not receive any comments on this issue during the comment period for these two rules, therefore, EPA does not plan on changing its methodology for the Third Thirds Rule.

When the BDAT QAPP was published in 1987, EPA did not have sufficient data or surrogate recoveries for treatment residuals. Therefore, EPA did not set specific requirements for data acceptability based on surrogate recoveries. The BDAT QAPP does require the analysis of surrogates for the specific organic methods that recommend or require that surrogates be analyzed (e.g., SW-846 Methods 8240, 8270, and 8080). These data can be evaluated and used to determine data acceptability limits for future studies.

10. ANALYTICAL METHODS

The Agency may use analytical methods that are not specifically identified in SW-846 for setting treatment standards provided that the methods comply with all appropriate detection limits, spike/surrogates recoveries, and other quality assurance criteria. For all data generated by the Agency for the Land Disposal Restrictions Program, EPA has stated the analytical methods used to generate the data and any method modifications that were implemented in analyzing the specific waste matrices. The information is available in the Onsite Engineering Reports completed for EPA generated data. Therefore, this information is

COMMENT NUMBER: 1-D-5 (continued)
DOCKET NUMBER: LD12-00159
COMMENTER: Waste Management, Inc. and
Chemical Waste Management, Inc.
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

available to the public. For data submitted by industry, EPA has published all of the information available in the public docket for the rules.

The Agency acknowledges the commenter's concerns on having standardized methods that can be used to demonstrate compliance with the treatment standards. The Agency has not specified analytical methods to be used to comply nationally with the concentration-based standards since this may place an unnecessary burden on the regulated community. For example, for organic constituents, EPA has generally used analytical methods for GC/MS analysis. EPA recognizes that analytical methods using GC techniques may also be used to generate data for compliance. Therefore, only allowing specific analytical methods on a national basis to be used for compliance may not be practical. However, this does not preclude permit writers from specifying the analytical methods to be used for compliance on a case-by-case basis. In addition, EPA will take the commenter's concern into account when EPA is developing its guidance on what constitutes "a good faith effort to achieve analytical sensitivity" that is required to demonstrate compliance with the concentration-based standards promulgated for the Land Disposal Restrictions Rules.

COMMENT NUMBER: 1-D-5 (continued)
DOCKET NUMBER: LD12-00159
COMMENTER: Waste Management, Inc. and
Chemical Waste Management, Inc.
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

11. RELIABILITY AND CORRECTION FACTORS

The adjustment of the data for the variability factor and the accuracy correction factor follow the methodology established for the First and Second Third Rule. EPA did not receive any substantial comments during these rules concerning the methodology being used to develop the treatment standards. Therefore, EPA does not intend to change its methodology for developing the treatment standards for the Third Thirds Rule.

Comment Number: 1-D-6
Docket Number: LD12-00164
Commenter: Institute of Chemical Waste Mgmt.
Issue: General BDAT Aspects
Subissue: PQLs
Comment:

Practical Quantitation Limits (PQL)

The Agency defines PQLs as the "lowest level of quantitation that a competent laboratory can be expected to achieve reliably". The presence of some organic constituents in treatment residue can result in PQLs being greater than the LDR treatment concentrations and other regulatory threshold levels. Because of a belief that destructive technologies will reduce matrix interferences, which make reaching PQLs difficult, the Agency appears unconcerned by this situation. The Agency indicates that treatment variances can be sought for those wastes with continuing analytical problems.

The members of the Institute recently submitted a letter to the Agency's Office of Solid Waste, Methods Section addressing similar analytical problems. Included in the letter were actual data that verified those situations where waste streams such as landfill leachate and gas condensates had interference difficulties. In addition, some ICWM members have experienced these analytical interferences when verifying treatment levels in incinerator ash, suggesting that the Agency belief about destructive technology may not be correct.

Thus, the ICWM is concerned that the verification of regulatory threshold concentrations (i.e, concentration-based BDAT and TCLP), which are lower than PQLs, is not analytically possible on a routine basis. If the Agency goes forward with its proposed approach, the outcome will likely be substantial numbers of treatability variances being requested by the regulated community, an undesirable situation for all concerned.

Resolving this problem is possible without extensive re-evaluation of BDAT levels or other regulatory threshold concentrations. The Institute recommends that the Agency mandate quality control/quality assurance (QA/QC) criteria and processes within the final regulations. Precision and accuracy requirements would be identified for each of those standards that fall below the PQL. Using Agency established QA/QC criteria, each laboratory could establish appropriate quantitation limits for each unique sample matrix and report these to EPA and state officials. Only in those rare instances where matrix interference could not be appropriately corrected would it be necessary to seek treatability variances. The ICWM believes that such a requirement would reduce the number of petitions for treatability variances.

COMMENT NUMBER: 1-D-6
DOCKET NUMBER: LD12-00164
COMMENTER: Institute of Chemical Waste Management
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

EPA has published its methodology to calculate treatment standards as the detection limit or concentration level (if detected) times the accuracy correction factor times the variability factor. This methodology was published as part of the First and Second Thirds Final Rules. The Agency did not receive any substantial comments concerning the methodology used to calculate the treatment standards.

EPA used the definitions for method detection limit and practical quantification limits as published in the proposed revisions to the September 1986 edition of Test Methods for Evaluating Solid Waste (also referred to as SW-846). In this document the Agency defined method detection limit as "the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero." Practical quantification limits (PQLs) are defined as "the lowest level of qualification that the Agency believes a competent laboratory can be expected to reliably achieve."

The PQLs published in SW-846 were established to provide a guidance for the analysis of waste samples by acting as minimum performance criteria. Thus, PQLs do not necessarily represent the lowest limits of analytical performance achievable for any given waste. Detection limits are the lowest limit that can be quantified for a given constituent in a given waste.

The PQLs in SW-846 were not developed for a specific waste matrix. PQLs are presented for groundwater and low-level soil. Correction

COMMENT NUMBER: 1-D-6 (continued

DOCKET NUMBER: LD12-00164

COMMENTER: Institute of Chemical Waste Management

ISSUE: General BDAT Aspects

SUBISSUE: PQLs

RESPONSE:

factors are given for other matrices such as high level soil and non-water miscible waste. Correction factors for treatment residuals such as incinerator ash are not given. Detection limits and PQLs are directly related to the constituent of interest and to the amount of interferences that are present in different waste matrices, therefore, detection limits and PQLs are generally significantly lower for treatment residuals than for untreated waste.

In some cases detection limits and PQLs by their definition in SW-846 can be equal since detection limits are the lowest level that can be quantified for a constituent and PQLs are defined as the lowest level that can be achieved reliably. PQLs are not defined as a factor or multiple of the detection limit. Therefore, data can be reported below a PQL level. Data should not be reported below the detection limit achieved for the specific constituent for a specific matrix. If PQLs were presented for data submitted for this rule, as a factor of the detection limit, then the detection limit information was used to assess the data.

The standards promulgated in the Third Third final rule are derived from detection limits achieved from studies of specific "F" or "K" waste or from the incineration of chemicals listed for specific "U" or "P" wastes or of a similar waste when the treatment standards are transferred. Since the detection limits used to derive the standards are based on the detection limits achieved by the laboratory that analyzed the sample, the

COMMENT NUMBER: 1-D-6 (continued)
DOCKET NUMBER: LD12-00164
COMMENTER: Institute of Chemical Waste Management
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

Agency believes that other laboratories can achieve the same detection limits. In cases where more than one set of data were used to develop the treatment standard, the highest detection limit was usually selected as the basis for the treatment standard. Therefore, the resulting treatment standards reflect the best level of analytical performance that is achievable for the waste.

The Agency does not plan to change its methodology for calculating treatment standards. As a result, only information on detection limits and recovery values were evaluated and used to assess the proposed standards. The Agency did not use any information presented in the HWTC study concerning practical quantification limits to recalculate the standards to be promulgated for the U and P waste codes and for multi-source leachate nonwastewaters. In addition, EPA did not reevaluate standards that were promulgated for wastes under the solvents rule, the First Thirds Rule or the Second Thirds Rule.

Several commenters, however, raised the issue that, in certain cases, analytical problems (i.e., difficulties in reliable quantitation at detection limits near the concentration-based treatment standards) may prevent demonstrating compliance with the proposed treatment standards for Third Third wastes. They also pointed out that this same problem already may exist for some First and Second Third wastes.

COMMENT NUMBER: 1-D-6 (continued)
DOCKET NUMBER: LD12-00164
COMMENTER: Institute of Chemical Waste Management
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

EPA has examined the data submitted to the Agency in support of these comments. While the Agency does not believe that the currently available data is conclusive, EPA acknowledges that there can be situations where lack of available analytical methods may prevent demonstration of compliance with the treatment standards.

EPA is dealing with this potential problem in a number of ways. First, EPA has examined detection limit data submitted by the commenters and compared them to the data used to develop the proposed standards. After a thorough technical evaluation, the Agency incorporated a portion of these data into the promulgated standards in today's rule. In addition, the Agency has reevaluated the existing BDAT data generated by the Agency, the transfer procedures used for some of the wastes, and recently available information and data on recovery of the BDAT organic constituents. Thus, EPA concurred with the commenters and concluded that many of the other proposed concentration-based treatment standards may not be achievable. As a result, EPA is promulgating revised standards for some organics in nonwastewaters that are higher than the proposed standards. In doing so, the majority of the commenters' concerns over achievability are no longer applicable. (Note: The Agency is continuing to study this issue and, if warranted, may adjust other standards, including some for First and Second Third wastes, after sufficient public notice.)

COMMENT NUMBER: 1-D-6 (continued)
DOCKET NUMBER: LD12-00164
COMMENTER: Institute of Chemical Waste Management
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

Second, in certain situations where compliance with a standard cannot be demonstrated for a particular waste due to problems with analytical detection limits and where the treatment technology employed was considered by the Agency to be BDAT, the Agency has decided that reliance upon the treatability variance petition process would place an unnecessary burden on both the regulated and regulatory communities. The Agency believes that where a waste has been treated with a combustion BDAT process (i.e., incineration or fuel substitution unit), and if the person has made a good faith effort to achieve maximum analytical sensitivity, the Agency will consider the person to have demonstrated compliance with the treatment standard.

In order to demonstrate compliance in such cases, the person will have had to make a good faith effort to demonstrate that the analyte of concern is not present in the waste at, or above, the treatment standard. To provide a more concrete basis for making such demonstrations, EPA intends to develop and issue guidance on what constitutes a good faith effort to achieve such analytical sensitivity within the next few months. This guidance is anticipated to be available at or near the effective date for the treatment standards.

In developing the treatment standards in today's rule, the Agency selected the treatment data (i.e., detection limit data) that best represented what the majority of wastes could meet. (Note: Most of these data were from incinerator units that were considered well-designed

COMMENT NUMBER: 1-D-6 (continued)
DOCKET NUMBER: LD12-00164
COMMENTER: Institute of Chemical Waste Management
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

and well-operated.) However, the Agency rejected detection limit data for some wastes, because the Agency determined that these wastes were not necessarily representative of the treatability of other wastes. After reexamination of all of the available detection limit data, the Agency has found that the majority of the detection limit data for these wastes will generally not exceed the promulgated treatment standards by more than one order of magnitude.

Thus, until this formal guidance is available, the Agency will therefore consider that, if an analytical sensitivity (i.e., detection limit) within an order of magnitude of the treatment standards has been achieved, compliance with the treatment standard will be considered to have been demonstrated provided the data represents the use of a combustion process (i.e., restricted to incineration or fuel substitution in a unit in compliance with all applicable technical operating requirements under 40 CFR 264 Subpart O and 265 Subpart O. Thus, it is likely that the combustion unit is being operated properly). The Agency believes that this is consistent with RCRA section 3304(m), in that, as an alternative to specifying a concentration-based standard for these wastes, the Agency could have promulgated a method of treatment specifying the use of incineration or fuel substitution.

EPA is thus amending section 268.7 and 268.43 to state that where a treatment standard for organics in nonwastewaters is based on a combustion technology, and a waste has been treated using that treatment

COMMENT NUMBER: 1-D-6 (continued)
DOCKET NUMBER: LD12-00164
COMMENTER: Institute of Chemical Waste Management
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

method (i.e., restricted to incineration or fuel substitution in units operated in accordance with the technical operating requirements of 40 CFR 264 Subpart O and 265 Subpart O), if a good faith effort has been made to analytically demonstrate compliance with the treatment standard, the treatment facility may certify compliance with the standard based on the data obtained. This includes all waste codes in First, Second, and Third Thirds where standards for organics in nonwastewaters are based on combustion processes or were transferred from wastes based on combustion processes.

The Agency also points out that in cases where a facility believes that waste-specific treatment standards cannot be met because their laboratory is still unable to achieve detection limits below the treatment standards on specific treatment residuals, and: 1) the facility complies with all the other conditions mentioned above; or 2) a facility utilizes a combustion technology other than incineration or fuel substitution; or 3) a facility utilizes a noncombustion technology that can be demonstrated to be equivalent, the facility may submit a petition for a variance from the treatment standards for that particular waste code (EPA construes 40 CFR 268.44 as encompassing such petitions). The facility must demonstrate that the analyses are in compliance with all other BDAT QA/QC provisions (as outlined in the BDAT General Quality Assurance Project Plan (EPA/530-SW-87-011, March 1987). Moreover, the petitioner must also demonstrate that the treatment process is a well-designed and well-operated BDAT process.

COMMENT NUMBER: 1-D-6 (continued)
DOCKET NUMBER: LD12-00164
COMMENTER: Institute of Chemical Waste Management
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

The commenter alludes to a recent letter to the Agency's Office of Solid Waste about matrix interference problems hindering analyses of landfill leachate and other samples. This letter was not submitted as part of a comment on the Third Third proposed rule so that Agency did not evaluate, the information in this letter in the process of developing final standards.

Comment Number: 1-D-7
Docket Number: LD12-00172
Commenter: Hazardous Waste Treatment Council
Issue: General BDAT Aspects
Subissue: PQLs
Comment:

A. Consideration Of PQLs When Establishing BDAT

The HWTC has submitted a comprehensive report on PQLs achievable for incinerator ash matrices. This report, entitled "Method Detection Limits and Practical Quantitation Limits For Incinerator Ash Matrices - Interlaboratory Study" was submitted on December 22, 1989, in time for the deadline in the proposed rule for data comments. A final report with more interpretation of results has been submitted January 8, 1990 to the LD12 Docket. This report covers studies performed by six member incineration firms, in cooperation with and under oversight provided by EPA's Methods Branch.

The data in this report indicates that for approximately 60% of the BDAT standards promulgated or proposed to date, PQLs are higher than the level set as the BDAT standard. This study identified a number of issues that affect PQL's and consequently BDAT due to universal methodology problems as well as certain unique characteristics of incineration ash. Although these problems were identified on incineration ash, it is our belief that the same problems exist with other non-wastewater residues. The HWTC urges EPA to consider the findings of this study in setting the final treatment standards for third-thirds wastes.

Comment Number: 1-D7 continued
Docket Number: LD 12 - 00172
Commenter: Hazardous Waste Treatment Council
Issue: General BDAT Aspects
Subissue: PQLs
Comment:

EPA provides a quote from SW846 in the preamble to the third-thirds rule (54 Federal Register 48385):

> "Sample PQLs are highly matrix-dependent. The PQLs listed herein are provided for guidance and may not always be achievable." (SW846 -Sept. 1986, Table 2, pp. 8250-5).

The PQLs provided in SW846 are based on "method detection limits in reagent water multiplied by a matrix dependent factor. This matrix dependent factors have only been determined for soil and water matrices. EPA further points out that:

> "the PQLs listed in SW846 are not always achievable for constituents as measured in untreated wastes." (54 Fed. Reg. 48385).

EPA however, has not determined PQls for untreated waste, only soil and water. EPA further only qualitatively argues in the Third-Thirds proposed rule preamble that they expect that PQLs for incinerator ash to be substantially lower than those for untreated waste.

Comment Number: 1 - D-7 continued
Docket Number: LD12 - 00172
Commenter: Hazardous Waste Treatment Council
Issue: General BDAT Aspects
Subissue: PQLs
Comment:

In making the statement, EPA is assuming that the only matrix interference effect is that arising from some major organic component or components in the untreated waste responding in such a way as to overwhelm the chromatogram masking the analyte. However, as proven by the HWTC interlaboratory study, there are major physical factors that affect the PQLs for incinerator ash or any non-wastewater treatment residue, making these higher for many cases than those PQLs achievable for water and soil. These factors are discussed in the separate report submitted by the HWTC, and include the absorption effects of the activated carbon and silicates in the incinerator ash, and the surface features of incinerator ash which include a large number of active sites for absorption effects. These effects make incinerator ash matrices different than soil or water matrices. In addition, there are serious method problems as shown in the report, regardless of the sample matrix that impose problems in detecting BDAT levels in any nonwastewater treatment residue.

The main point is that EPA has not determined PQLs for any waste matrices or nonwastewater treatment residue, including incinerator ash. HWTC member companies at great expense have completed a detailed interlaboratory PQL study specifically on incinerator ash matrices. This study was done in full cooperation with the EPA Methods Branch, with guidance and support provided by David Friedman and Barry Lesnick. The HWTC requests that the Waste Treatment Branch of EPA set final treatment standards for third-third waste constituents consistent with the true PQLs for incinerator ash determined by our member companies.

COMMENT NUMBER: 1-D-7
DOCKET NUMBER: LD12-00172
COMMENTER: Hazardous Waste Treatment Council
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

The Agency has used the method detection limit study submitted by the Hazardous Waste Treatment Council (HWTC) to the Agency during the comment period for the Land Disposal Restrictions Rule for Third Third Scheduled Wastes to evaluate whether industry's laboratories can reliably quantify regulated constituents at the level of both the proposed and previously promulgated concentration-based standards established for U and P waste codes. These concentration-based standards are based on incineration ash data from 14 incineration studies conducted by the Agency, specifically, for the Land Disposal Restrictions Program.

The report did state that approximately 60 percent of the BDAT standards promulgated or proposed to date were below the PQLs. This statement is based on the HWTC's definitions of PQLs. The Agency acknowledges the commenters concerns with standards that were promulgated under the First and Second Thirds Rules and Solvent Rule; however, only standards proposed for the Third Thirds rule will be reexamined by the Agency. The alternative certification procedure adopted in today's rule should provide relief in all legitimate cases while EPA studies this issue (which is beyond the scope of this rule). Further, EPA has developed an interim means of certifying compliance with all standards in Part 268 and may revise earlier standards as it has more time to study issues relating to potential problems in achieving detection limits.

The intent of HWTC's study was to verify whether industry's laboratories could routinely quantify the constituents regulated for U and P waste codes and to identify the constituents which could not be

COMMENT NUMBER: 1-D-7 (continued)
DOCKET NUMBER: LD12-00172
COMMENTER: Hazardous Waste Treatment Council
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

quantified at the proposed or promulgated concentration-based standards. The HWTC study consisted of spiking the regulated constituents in samples of incineration ash at levels near the concentration-based standards and analyzing the samples using SW-846 methods, specifically the micro extraction technique for volatile organics followed by Method 8240 and soxhlet extraction for the semivolatile organics followed by Method 8270. The study was conducted at six laboratories. Each laboratory analyzed seven replicates to determine the method detection limit and seven spiked samples to determine the recovery values for each constituent. The study included information on method detection limits and recovery values. In addition, HWTC calculated treatment standards using their methodology, which is based on practical quantification levels (PQLs) for each constituent. HWTC arbitrarily defined PQLs as a value five times the method detection limit. EPA reiterates that PQLs are minimum measures of analytical laboratory performance, as defined in SW-846, for the use of laboratories in assessing their own performance in terms of success in reaching low levels of certain analytes in certain matrices. Outside of this function of providing a quantitative definition of the boundaries between poor and competent analytical performance, PQLs have no regulatory power.

Although HWTC did conduct a comprehensive method detection limit study for most of the BDAT constituents regulated in the Third Thirds Rule as well as the First and Second Thirds Rules, the documentation submitted to EPA as part of the comment omitted the following items thereby limiting the usefulness of the study:

COMMENT NUMBER: 1-D-7 (continued)
DOCKET NUMBER: LD12-00172
COMMENTER: Hazardous Waste Treatment Council
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

- Although the six laboratories analyzed seven replicates to determine the method detection limits, data were only presented for the average from each laboratory and the pooled average value calculated from all of the data points submitted by the individual laboratories. As a result, EPA could not evaluate the precision each individual laboratory achieved for determining the detection limits nor could the range of detection limits associated with each set of replicates be examined. Therefore, EPA could not compare the precision of the HWTC data relative to EPA's and as a result could not assess HWTC's comments concerning detection limit precision.

- Characterization data for the untreated waste that was used to generate the incinerator ash used by a laboratory participating in this study were not available. As a result, EPA could not assess the incinerator burns to determine whether substantial treatment of the waste occurred or whether the ash was obtained from a waste that is more or less characteristic of the waste in question than the ash EPA analyzed to set its standards on.

- The measurable levels of both volatile and semivolatile organic constituents present in the unspiked ash suggest inadequate incinerator time or temperature and thus the ash may have been generated from incinerators that were not well-operated or well-designed. The presence of these volatile and semivolatile constituents at measurable quantities in the unspiked ash may also indicate that additional matrix dependent interferences may have been present in the samples used for this study by some of the participating laboratories.

- Incinerator process documentation provided in the study was inadequate to assess whether the incinerators used to generate the ash were well-designed and operated. HWTC did provide primary and secondary chamber combustion temperatures, combustion chamber carbon monoxide content, combustion gas velocity, feed rate, halogen content, and ash content in its comment submitted to the November 22, 1989 proposed standards. The names and addresses of

COMMENT NUMBER: 1-D-7 (continued)
DOCKET NUMBER: LD12-00172
COMMENTER: Hazardous Waste Treatment Council
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

> the incinerators generating the ash used in HWTC's study were also given. Some of them were used in several of EPA's own 14 test burns. The six incinerators participating in this study were identified as five rotary kiln incinerators and one multiple hearth incinerator. The limited process data available in the report were presented as ranges plus averages. No data on length of burn, graph charts recording the operating parameters during the incineration burns, or flow sheets of the incineration system were given. In addition, no information was provided on either the sampling point where the ash was collected or the sampling procedures used to collect the ash samples; therefore, EPA could not compare these data with the data collected from the 14 test burns conducted by EPA.

In addition, the HWTC study used different preparation methods before analyzing the samples than those used in EPA's 14 incineration studies. For volatile organics, the HWTC study used the micro extraction technique prior to analysis by SW-846 Method 8240, whereas the EPA incineration test burns used the purge and trap method prior to analysis by SW-846 Method 8240. For semivolatile organics, the HWTC study used soxhlet extraction prior to analysis by SW-846 Method 8270, whereas the EPA incineration studies used sonication prior to analysis by SW-846 Method 8270. One difference between the preparation methods used by HWTC study versus EPA's incineration burns was the sample size used in the analysis. For volatile organics, HWTC used 4 grams of sample in the micro extraction technique versus 5 grams used for purge and trap extraction. For semivolatile organics, HWTC used 10 grams for the soxhlet extraction versus 30 grams used for the sonication extraction. This difference in sample size made it difficult to compare the data from

COMMENT NUMBER: 1-D-7 (continued)
DOCKET NUMBER: LD12-00172
COMMENTER: Hazardous Waste Treatment Council
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

the two sources. Due to the smaller sample size used in the HWTC study, the detection limits calculated in the study would be higher than those achieved in the 14 incineration test burns conducted by EPA.

EPA also examined the recovery values presented in the HWTC study that were generated by the six laboratories from the analysis of seven replicates for each constituent. EPA used these data to reevaluate the proposed standards. If these recovery values were outside a range of 20 to 200 percent for over half of the data presented then the standards for that specific analyte were reexamined. For some analytes, the HWTC data indicated that a specific laboratory may have had a problem with matrix interferences with specific parts of the chromatograms since reported detection limits were significantly higher than the detection limits reported by the other participating laboratories and the recovery values were also not consistent with the data available from the other laboratories. These matrix interferences could be due in part to the waste that was used to generate the ash or to the incomplete combustion of the ash as supported by the concentration levels of various constituents in the unspiked ash.

EPA did not review any standards that were not in the proposed Third Thirds Rule, specifically, those that were promulgated in the First Thirds and Second Thirds Rule and the Solvent Rule. Changes occurred primarily when EPA reevaluated cases where the HWTC study reported higher detection limits than those used by EPA to calculate standards. Although

COMMENT NUMBER: 1-D-7 (continued)
DOCKET NUMBER: LD12-00172
COMMENTER: Hazardous Waste Treatment Council
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

EPA had generally used the highest of the set of up to 14 incineration ash detection limits as the basis of the proposed standards, some exceptions had been made in the case of outliers and in cases where EPA believed a particular raw waste matrix best represented the waste code in question. In reviewing the HWTC study information, EPA reexamined those exceptions where the detection limit fell significantly below HWTC's reported detection limits and where there were anomalously high or low recoveries.

EPA had also published a report entitled "USEPA Method Study 36: SW-846 Methods 8270/3510 GC/MS Method for Semivolatile Organics: Capillary Column Technique; Separatory Funnel Liquid-Liquid Extraction," EPA/600/S4-89/010. This study documents analytical problems with several analytes for which Third Thirds standards were proposed. These analytes also were noted as problems in the HWTC study. HWTC also presented the results of this study in their comment.

Based on all the information evaluated from the HWTC study and EPA's Method 36 Study, and the 14 incineration test burns, the standards for the compounds listed in Table 1 were changed from the proposed rule. Below is the explanation of why these standards were changed.

Concentration-based standards for twelve U and P constituents (acetone, chloromethane, 4,4'-methylene bis(2-chloroaniline) 1,4-dioxane, ethyl acetate, ethyl ether, methyl ethyl ketone, N-nitrosopiperidine,

COMMENT NUMBER: 1-D-7 (continued)

DOCKET NUMBER: LD12-00172

COMMENTER: Hazardous Waste Treatment Council

ISSUE: General BDAT Aspects

SUBISSUE: PQLs

RESPONSE:

N-nitrosopyrrolidine, 5-nitro-o-toluidine, N-nitrosodi-n-butylamine, and acrylonitrile) were revised to reflect detection levels in different wastes because the matrices used to generate the proposed standards were ash from burns of phthalate waste (K024), disulfoton wastes (K037), acetonitrile/acrylonitrile wastes (K011, K013, and K014), all unique matrices. Acetone, chloromethane, 1,4-dioxane, ethyl acetate, acrylonitrile, ethyl ether, and methyl ethyl ketone are volatile organics while K024 and K037 raw wastes, from which proposed standards for some of these compounds were derived, are high in semivolatile compounds such as PNA's. The acetonitrile/acrylonitrile wastes (K011, K013, and K014) contain volatile organics; however, it is considered a unique matrix that may not be appropriate for transfer for U and P waste codes. EPA chose to base the promulgated standards on a matrices such as incineration ash from wood-preserving wastes (K001-PCP and creosote), from ethylene dichloride and other mixed wastes (K019 incineration test), or from veterinary pharmaceutical wastes (K102) because these are complex matrices with high concentrations of many organic compounds: volatiles, semivolatiles, chlorinateds, and others, and, consequently, are particularly difficult to analyze so that detection limits from these compounds are particularly achievable for U and P wastes and multi-source leachate nonwastewaters.

N-nitrosopiperidine, N-nitrosopyrrolidine, 5-nitro-o-toluidine, 4,4'-methylene bis(2-chloroaniline), and N-nitrosodi-n-butylamine proposed standards came from the phthalates (K024) waste matrix; the

COMMENT NUMBER: 1-D-7 (continued)
DOCKET NUMBER: LD12-00172
COMMENTER: Hazardous Waste Treatment Council
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

promulgated standards derive from detection levels found in the wood preserving waste (K001-PCP) burn, whose value as a source of data is discussed above.

Because the detection limits reported in the HWTC study for vinyl chloride lies well above the detection limit EPA used to develop a concentration-based standard for this waste, EPA is promulgating a higher concentration-based standard. The promulgated standard for vinyl chloride reflects the choice of a different and higher detection limit, this one from the ethylene dichloride (K019) waste matrix.

For acrolein, acetonitrile, 3, 3'-dichlorobenzidine, p-dimethylaminoazobenzidine, chlorobenzilate, 2-naphthylamine, and cyclohexanone, the commenter reported such drastic detection limit discrepancies and/or extreme recoveries that EPA believes these analytes belong in the category of those not amenable to quantification. Therefore, a treatment method will be promulgated instead of a revised concentration-based nonwastewater treatment standard.

For 2-chloro-1,3 butadiene, the commenter reported zero recoveries for several sets of replicates and extremely variable recoveries for another. EPA's own experience in quantifying 2-chloro-1,3 butadiene led the Agency to promulgate a method of treatment for 2-chloro-1,3 butadiene rather than a concentration-based standard as proposed.

COMMENT NUMBER: 1-D-7 (continued)
DOCKET NUMBER: LD12-00172
COMMENTER: Hazardous Waste Treatment Council
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

The Third Thirds proposed rule had solicited comment on whether benzal chloride in waste treatment residual matrices could be routinely quantified. The Agency had believed that benzal chloride was too unstable in water to be routinely quantified. No specific information demonstrating successful measurement of benzal chloride were submitted during the comment period. EPA is thus promulgating incineration as a technology-based standard for benzal chloride due to its instability in water instead of the proposed concentration-based standard. (Note that EPA is promulgating as proposed the concentration-based standard for benzal chloride as a constituent of K015 since EPA has analytical data for the untreated K015 wastes and the treatment residuals from incineration of this waste.)

EPA also changed several standards in response to information in a recently released EPA Office of Research and Development (ORD) study, EPA/600/S4-89-010, "USEPA Method Study 36: SW-846 Methods 8270/3510 GC/MS Method for Semivolatile Organics: Capillary Column Technique; Separatory Funnel Liquid-Liquid Extraction," (hereafter referred to as EPA's Method Study 36). This study evaluates the analytical methods most commonly used to quantify semivolatile analytes. "Semivolatiles" are a category of organic chemical including more than half of the compounds regulated in this rule. Although this study was carried out in support of the RCRA ground-water monitoring regulations and consequently looked only at aqueous matrices rather than at the incinerator ash matrices used to develop these nonwastewater concentration-based standards, the study

COMMENT NUMBER: 1-D-7 (continued)
DOCKET NUMBER: LD12-00172
COMMENTER: Hazardous Waste Treatment Council
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

documents such serious analytical problems with several Third Thirds analytes that EPA has chosen to promulgate incineration as a treatment standard rather than the proposed concentration-based standards. These analytes are: aramite, benzenethiol, phthalic anhydride, dibenzo(a,e) pyrene, dibenzo(a,i)pyrene, p-benzoquinone, hexachlorocyclopentadine, hexachlorophene, 1,4-naphthoquinone, 1-naphthylamine, N-nitrosodimethylamine, pentachloroethane, resorcinol, and tris(2,3-dibromophosphate).

This study determined how reliably these analytes can be quantified in aqueous matrices by examining the recoveries obtained and the precision achieved over the course of multiple analyses by several laboratories. Statistical analysis indicated that the recovery data for the analytes listed above were so unrealistically high or low that EPA, in the study, has declined to recommend the use of SW-846 methods 3510/8270 for quantifying these analytes in ground-water monitoring at RCRA-permitted facilities.

In promulgating the Third final rule, EPA chose to incorporate this recommendation about the severity of the problems associated with SW-846 methods 3510/8270 and thus move these analytes into the category of those compounds to be regulated with technology-based standards. The reason for this decision is that the study documents significant problems with GC/MS (gas chromatography/mass spectrometry which is the technique used almost exclusively to quantify organic compounds in all environmental samples and which is the basis not only of SW-846 8270, but of most other

COMMENT NUMBER: 1-D-7 (continued)

DOCKET NUMBER: LD12-00172

COMMENTER: Hazardous Waste Treatment Council

ISSUE: General BDAT Aspects

SUBISSUE: PQLs

RESPONSE:

SW-846 methods for organic analytes) which are common to most methods used to quantify these compounds.

However, EPA makes one exception to its decision to promulgate methods as standards for those analytes recommended for deletion from methods 3510 plus 8270 in this ORD study. Since EPA has specific analytical data on the incineration of Dinoseb and since the data was of sufficient QA/QC, EPA is promulgating the concentration-based Dinoseb standards as proposed.

In reviewing its own data, EPA also decided that inadequate documentation exists demonstrating successful quantification of cis- and trans-1,2-dichloro-3-butene. Considering this, together with the problems in quantifying these two as a pair because their widely different boiling points complicate their behavior in the GC/MS apparatus, EPA is promulgating incineration as a method rather than the proposed concentration-based standard.

As noted earlier, The HWTC comment also included calculations of treatment standards based on PQLs. In the HWTC comment, PQLs were defined as five times the method detection limit. HWTC's methodology to calculate treatment standards is the PQL times the accuracy-correction factor (as calculated from the average recovery values) times the variability factor. EPA has published its methodology to calculate treatment standards as the detection limit or concentration level (if

COMMENT NUMBER: 1-D-7 (continued)
DOCKET NUMBER: LD12-00172
COMMENTER: Hazardous Waste Treatment Council
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

detected) times the accuracy correction factor times the variability factor. This methodology was published as part of the First and Second Thirds Final Rules. The Agency did not receive any substantial comments concerning the methodology used to calculate the treatment standards.

In addition, EPA used the definitions for method detection limit and practical quantification limits as published in the proposed revisions to the September 1986 edition of Test Methods for Evaluating Solid Waste (also referred to as SW-846). In this document the Agency defined method detection limit as "the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero." Practical quantification limits (PQLs) are defined as "the lowest level of qualification that the Agency believes a competent laboratory can be expected to reliably achieve."

The PQLs published in SW-846 were established to provide a guidance for the analysis of waste samples by acting as minimum performance criteria. Thus, PQLs do not necessarily represent the lowest limits of analytical performance achievable for any given waste. Detection limits are the lowest limit that can be quantified for a given constituent in a given waste.

The PQLs in SW-846 were not developed for a specific waste matrix. PQLs are presented for groundwater and low-level soil. Correction factors are given for other matrices such as high level soil and

COMMENT NUMBER: 1-D-7 (continued)
DOCKET NUMBER: LD12-00172
COMMENTER: Hazardous Waste Treatment Council
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

non-water miscible waste. Correction factors for treatment residuals such as incinerator ash are not given. Detection limits and PQLs are directly related to the constituent of interest and to the amount of interferences that are present in different waste matrices, therefore, detection limits and PQLs are generally significantly lower for treatment residuals than for untreated waste.

In some cases detection limits and PQLs by their definition in SW-846 can be equal since detection limits are the lowest level that can be quantified for a constituent and PQLs are defined as the lowest level that can be achieved reliably. PQLs are not defined as a factor or multiple of the detection limit. Therefore, data can be reported below a PQL level. Data should not be reported below the detection limit achieved for the specific constituent for a specific matrix. If PQLs were presented for data submitted for this rule, as a factor of the detection limit, then the detection limit information was used to assess the data.

The standards promulgated in the Third Third final rule are derived from detection limits achieved from studies of specific "F" or "K" waste or from the incineration of chemicals listed for specific "U" or "P" wastes or of a similar waste when the treatment standards are transferred. Since the detection limits used to derive the standards are based on the detection limits achieved by the laboratory that analyzed the sample, the Agency believes that other laboratories can achieve the same detection

COMMENT NUMBER: 1-D-7 (continued)

DOCKET NUMBER: LD12-00172

COMMENTER: Hazardous Waste Treatment Council

ISSUE: General BDAT Aspects

SUBISSUE: PQLs

RESPONSE:

limits. In cases where more than one set of data were used to develop the treatment standard, the highest detection limit was usually selected as the basis for the treatment standard. Therefore, the resulting treatment standards reflect the best level of analytical performance that is achievable for the waste.

The Agency does not plan to change its methodology for calculating treatment standards. As a result, only information on detection limits and recovery values were evaluated and used to assess the proposed standards. The Agency did not use any information presented in the HWTC study concerning practical quantification limits to recalculate the standards to be promulgated for the U and P waste codes and for multi-source leachate nonwastewaters. In addition, EPA did not reevaluate standards that were promulgated for wastes under the solvents rule, the First Thirds Rule or the Second Thirds Rule.

The Agency agrees with HWTC that properly developed and validated analytical methods should be used to analyze the constituents regulated in the Third Thirds Rule. EPA has evaluated the analytical data used to calculate the treatment standards for each constituent for each regulated waste code under the Third Thirds Rule. EPA has not set any concentration-based standards for constituents that it believes cannot be analyzed using EPA methods.

COMMENT NUMBER: 1-D-7 (continued)

DOCKET NUMBER: LD12-00172

COMMENTER: Hazardous Waste Treatment Council

ISSUE: General BDAT Aspects

SUBISSUE: PQLs

RESPONSE:

The commenter has specifically noted difficulties in analyzing methanol in incinerated ash at the levels promulgated for F001-F005 wastes. Issues dealing with this waste code were addressed during the comment period for the Solvent Rule in November 1986 and will not be addressed in this Rule.

For the calibration issue, the Agency acknowledges the commenter's support. Additionally, the Agency agrees with the commenter that all constituents with concentration-based standards must be amenable to analysis by SW-846 methods. EPA further agrees that the use of surrogate compounds to verify compliance is inappropriate.

Analytical standards are commercially available for benzo(a)pyrene, benzo(g,h,i)perylene, and benzo(k)fluoranthene. Therefore, EPA will promulgate concentration-based treatment standards for these three constituents. For 2-chloro-1,3-butadiene, the commenter states that a commercial calibration reagent was unavailable; however, EPA has proposed a treatment method as standard for the U and P wastes; therefore, there is no requirement to analyze for this constituent and no need to obtain this commercial analytical standard.

For 1,2,7,8-dibenzo(a,i)pyrene, the Agency recognizes that there are analytical problems analyzing this constituent; therefore, the Agency will promulgate a treatment method as standard. As a result, there will be no requirement to analyze for this constituent and no need to obtain this commercial analytical standard.

COMMENT NUMBER: 1-D-7 (continued)
DOCKET NUMBER: LD12-00172
COMMENTER: Hazardous Waste Treatment Council
ISSUE: General BDAT Aspects
SUBISSUE: PQLs
RESPONSE:

As stated earlier, EPA agrees with the commenter that there are analytical problems associated with the following constituents:

Acrolein
Cyclohexanone
Acetonitrile
Benzenethiol
Maleic anhydride
Hexachlorophene
4-Aminobiphenyl
Hexachlorocyclopentadiene
Trans-1,4-dichloro-2-butene
Resorcinol
2-nitropropane
Benzidines
N-nitrosodimethylamine
Tris(2,3-dibromopropyl)phosphate

Therefore, EPA will promulgate treatment methods for the nonwastewater forms of these U and P wastes.

The Agency believes that the following constituents can be analyzed and will promulgate concentration-based standards for the nonwastewater forms of the following U and P wastes:

1,4-dioxane
Aniline
3-Methylcholanthene
Pentachloronitrobenzene
Methapyrilene

It should be noted that the commenter also listed 3-chloro-1-propane as having analytical problems, however, this constituent is not on the BDAT list and is not regulated. It is assumed that the commenter meant 3-chloro-1-propene (3-chloropropene). EPA believes that this constituent can be analyzed and will promulgate a concentration-based nonwastewater treatment standard.